Field visit report - Parbhani
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Executive Summary

Maharashtra, especially Marathwada, has been witnessing increasing agricultural and drinking water stress in recent years. As a possible solution to this, Government of Maharashtra (GoM) has rolled out a new programme, Jal Yukta Shivar (JYS), as a means to combat this stress. The JYS is a successor of many earlier watershed programs which have already been implemented, and some of which are ongoing, such as the Integrated Watershed Management Programme (IWMP).

The JYS proposes a framework for village level water balance calculation which includes estimation of crop-water requirements, drinking water stress etc. The interventions to be proposed under this programme and the funds required will be used from already existing programmes like IWMP, Mahatma Gandhi National Rural Guarantee Scheme (MGNREGS), Mahatma Phule Jal Bhoomi Abhiyan, National Horticulture Mission and so on. JYS promotes an integration and coordination between various government agencies and programmes during planning and implementation levels and stresses on people's participation as one of the key objectives.

In order to understand and assess the roll-out of the JYS, a team of researchers undertook a visit of six villages (Pedgaon, Bhogaon, Takli Kumbhakarna, Singnapur, Narsapur and Nagapur) of Parbhani block in Parbhani district. Out of these, all except Takli Kumbhakarna were JYS villages.

Following are some of the key observations noted during the visit to above villages –

1. Non-uniform progress. Work had commenced in three villages and not at all in two villages. The non-JYS village was found to have a severe drinking water problem but was not in JYS.

2. Ambiguous cropping pattern. A cropping pattern for the village is an important calculation done within the JYS plan for the village. However, there is no specified methodology for its computation, nor is there a commitment by the village to stick by this. In the villages studied, this was presumably done by taking an average of previous years patterns. This is inappropriate on two counts. Firstly, it consolidates cropping patterns which may be unsustainable. Secondly, if the JYS interventions actually succeed and lead to more water, this cropping pattern may change, and a vicious loop may be entered.

3. Differing crop water demands. The net crop water demand calculation uses multiplication factors in terms of TCM (thousand cubic metres) water per hectare. These factors were found to be inconsistent across villages. Thus the net water balance number (in TCM) is prone to error. These numbers need to be recomputed and verified with actual farming practices. Field level irrigation data, by source (groundwater, canal, lift etc.) and by application (drip, flood etc.) should also be considered while calculating water demand.

4. No Irrigation field data. Field data of existing irrigation wells and their use is absent. Considering growing exploitation of groundwater, this data would help in better understanding the groundwater scenario of the region and would be an important input in designing crop plans. In all villages, groundwater was seen to be in a precarious position.

5. Possible Spatial Imbalance. The interventions are planned around a residual numerical water budget, where each intervention is to account for a certain addition to groundwater. There is no spatial or hydro-geological basis for the assumptions that (i) all the impounded water is directly available for use, and (ii) the spatial reach of the added groundwater is available to needy farms. Such a spatial mismatch was seen in the villages. Thus, a CNB in the north of a village impounding 100 TMC would be of little use in the south but this spatial element of planning is absent.

6. Missing Drinking Water Plan. The only focus on the program seems to be on water for agriculture. Drinking water stress in most villages is severe. However here is no reporting on this stress and no measures in the JYS plan. Water quality is a creeping menace and at least three villages reported some issue, while one village reported kidney failures. Most traditional sources of drinking water within the *gavthan* are dry and private PWS schemes are present in most villages. Landless and poor households seem to be hard-pressed to meet their daily drinking water needs. The women, the landless and the poor should be met separately and their issues documented and designed for.

7. No Maps or other legacy data. Use of maps and GIS data is absent in preparing JYS plans. This data is available with different departments like Agriculture (IWMP), GSDA (Groundwater Surveys and Development Agency), MRSAC (Maharashtra Remote Sensing Application Centre) and so on. Use of GIS will help in problem identification and formulation of problems. At the same time, secondary data such as from NRDWP (National Rural Drinking Water Programme) or Census will substantially improve the targeting of issues.

8. Policy issues. There were some policy implementation issues as well. In at least two villages, residents did not know of the JYS plan or consultation. A women's meeting held before the *gram sabha* would have pointed out drinking water as an important issue. In at least two locations, there was a dispute about parcel boundaries. This was obstructing the implementation of recharge structures for two drinking water wells.

Following is the summary table of the villages visited –

Name	Population	Is SC dominated?	Area (ha)	Is JYS village?	Total water demand (TCM)	Runoff impounded by existing + proposed structures (TCM)	Water balance (TCM)	Dist to dr. water source more than 500m (% population)	Pvt dr. water schemes present	Quality prob. as per NRDWP
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Pedgaon	11757	N	3226.5	Y	1997.49	2057.72	60.23	37%	Y	Y
Bhogaon	2350	N	1103.6	Y	784.25	955.7	171.45	52.3%	N	Y
Takli Kumbhakarna	7045	N	-	N	-	-	-	53.9%	Y	Y
Singnapur	5016	N	1640	Y	1343.75	975.33	-368.42	41.9%	-	Y
Narsapur	1343	N	397	Y	250.9	74.06	-176.84	56.4%	Y	N
Nagapur	613	Y	394	Y	257.19	35.05	-222.14	93.4%	N	Y

Data for columns 2, 4, 5, 6, 7 and 8 is taken from the baseline report for all JYS villages in Parbhani block. Columns 2 and 9 data is taken from Census 2011 village-wise data of assets and amenities. Column 10 data is as per the preliminary discussions with people in the village, and needs to be further verified in detail. Column 11 is taken from NRDWP reports of habitation-wise chemical-contamination testing of drinking water sources.

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1. Introduction

An exploratory visit was arranged on 11th April to three villages, Pedgaon, Bhogaon and Takli Kumbhakarna and then again on 21st April to another three villages, Singnapur, Narsapur tarf Parbhani and Nagapur. All these villages are in Parbhani block of the Parbhani district, all these villages except Takli Kumbhakarna are selected under Jalyukta Shivar Abhiyan (JYS) programme. Figure 1 shows the villages visited on the map.

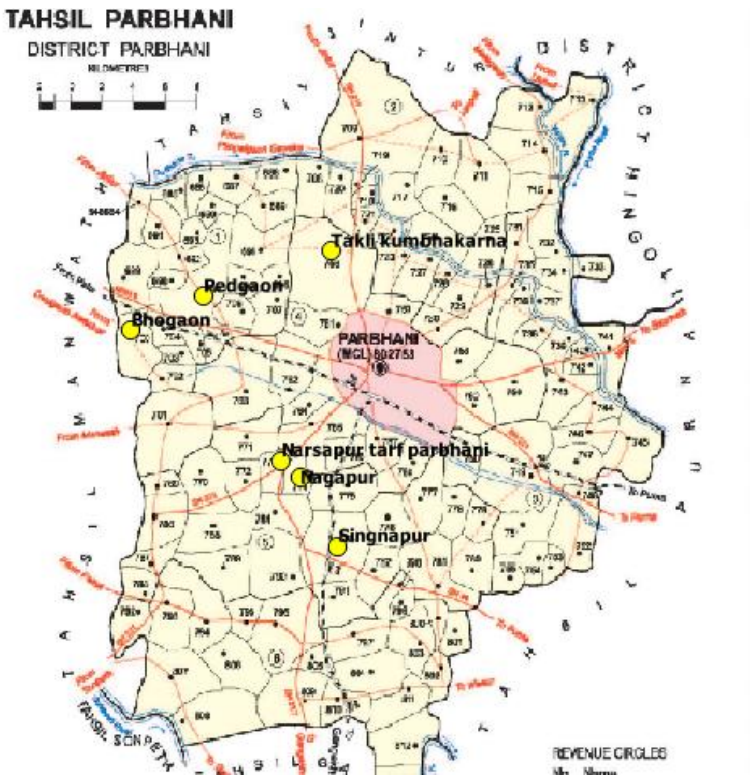


Figure 1 Villages visited

JYS is the Government of Maharashtra's programme to provide water for all and make villages scarcity-free. The Government Resolution (GR) for this programme was released on 5th Dec 2014. The GR is available at following link - https://www.maharashtra.gov.in/site/Upload/Government%20Resolutions/English/20141206 1015068426.pdf.

The primary motive of the visit was to understand the design and implementation of JYS programme and to check for the possibilities of collaboration between IIT Bombay, CTARA (Centre for Technology Alternatives for Rural Areas) and Collector, Parbhani district, to supplement the JYS planning and design framework in order to make the programme more robust and sound.

The team visiting these villages included Prof. Milind Sohoni (Head, CTARA, IIT Bombay), Hemant Belsare (PhD student, CTARA, IIT Bombay), Pankaj Kela (independent researcher working with International Water Management Insitute IWMI), Gopal Chavan (Faculty at Shri Guru Gobind Singhji Institute of Engineering, Nanded SGGS) and Pooja Prasad (Phd student, CTARA, IIT Bombay).

The visit was arranged by the Resident Deputy Collector, Parbhani, Shri. Subhash Shinde. Shri. Shinde was personally present for the visits to Pedgaon and Singnapur and introduced us to the local representatives, villagers as well as Taluka Krushi Adhikari, Shri Giri, and Krushi Sahayyaks and *Talathi*s in all the villages. All were helpful and provided us with relevant information about local conditions, some of the maps like revenue maps and JYS village plans.

During the visit, meetings and discussions were held in each village with the Sarpanch, Gram Sevak, Krushi Sahayyak, Gram Sadasya (if present), ZP elected representatives (if present), *talathi* (if present) and some residents. Issues related to water scarcity, works done under IWMP, works proposed under JYS, awareness about JYS etc. were discussed, which was followed by small investigatory survey of the village where some key streams, traditional drinking water wells, percolation tanks, CNBs etc. were visited along with the villagers. This gave us some idea about the local conditions viz. terrain, drinking and livelihood water availability, farming practices, groundwater scenario.

Figure 2 – Meeting at Pedgaon (top), Farm pond inauguration at Nagapur (bottom)

Figure 3- Krushi Sahayyak showing revenue map (Nagapur)

A compendium of JYS plans for the 34 selected villages of Parbhani block, prepared by the Agriculture department, was also studied to understand the planning process and water balance calculation. Agriculture Supervisor for Parbhani block, Shri. Bhise helped in explaining the details of the process.

Along with the village visits and interviews with different government officials, some basic secondary information regarding drinking water schemes and water quality data from National Rural Drinking Water Programme (NRDWP) reports and drinking water access data

from Census 2011 Amenities and Assets reports was also studied for the villages in Parbhani block.

A small presentation was made to the Collector and Shri. Subhash Shinde at the end of the two visits. Following is a more detailed summary report of the two visits which contains notings about JYS planning and design framework and some preliminary recommendations.

2. Summary

2.1 Village-wise water budget calculation –

In the report for JYS for Parbhani block, water balance for each JYS village is calculated. The process for calculating this water balance was partially explained by the Krushi Supervisor Shri. Bhise and other Krushi Sahayyaks. The JYS village plan format is attached as appendix to this report. The process of calculating water balance is as follows –

1) Estimation of runoff –

The estimation of surface runoff is done as per the Strange's rainfall-runoff relationship. Rainfall is multiplied by a multiplier which is given for area with particular slope-range. The slopes in Parbhani are too small and hence most of the rainfall is infiltrated below surface and only 15-20% is available as surface runoff. This surface runoff is treated as inflow component in the water balance calculations.

2) Runoff impounded – This is the amount of water stored / impounded by existing / proposed conservation structures like Cement Nala Bunds, Percolation Tanks, Farm Ponds, Graded Bunding, Well recharge structures and so on. The exact figures are arrived at based on the thumb rules provided in the Paanlot Maargadarshika handbook. This water is available for use directly and serves as storage in the water balance calculations.

3) Water demand calculations –

- Drinking water – based on population and number of cattle, other livestock
- Agricultural water – calculated using crop-water requirement and area under crop for all crops grown in the village (the crop-water requirement numbers for all crops (in TCM/ha) are taken form ICAR's handbook for agricultural practices for different crops).

This is treated as the outflow component in the water balance calculations.

The water balance calculations can be explained in following steps–

1) $\boldsymbol{Total\ rainfall * Strange\ multiplier\ (between\ 0\ and\ 1) = Surface\ runoff}$

2) $\boldsymbol{Water\ available\ for\ use = Surface\ runoff\ impounded\ by\ structures}$

3) $\boldsymbol{Total\ water\ demand = drinking\ water\ demand + crop\ water\ demand}$

4) $\boldsymbol{total\ water\ demand - Runoff\ impounded = JYS\ target}$

Thus, the water balance is basically a surface runoff budget. The primary motive is to make as much use of runoff generated within the village boundary as possible without depending on external sources like canals and rivers outside village boundary. More the runoff impounded through conservation structures, more positive will be the balance.

2.1.1 Findings

1) Crop water requirement

The crop-water requirement figures used in the water-balance calculations correspond to the extra water (besides rainfall and soil moisture available due to rainfall), i.e. the irrigations which farmer must give to the crops. e.g. for Moong, Corn and Udid, the crop-water

2. पिकासाठी पाणी

पिकाचे नाव	क्षेत्र हे.	आवश्यक पाणी प्रति हे.TCM	एकुण आवश्यक पाणी TCM
मुग	17.00	0.30	5.10
उडिद	20.00	0.30	6.00
सोयाबीन	667.00	0.40	266.80
मका	35.00	0.40	14.00
तुर	15.00	0.50	7.50
कापुस	611.00	0.50	305.50
चारा पिके	38.00	0.50	19.00
गहु	53.00	0.60	31.80
हरभरा	317.00	0.50	158.50
ज्वार	410.00	0.50	205.00
गळीत धान्ये	10.00	0.50	5.00
भाजीपाला	30.00	0.50	15.00
फु लपिके	4.00	0.45	1.80
फळबाग	56.00	2.00	112.00
इतर (ऊस/हळद)	90.00	0.80	72.00
एकुण			1225.00

Figure 4 - Crop water requirement - Singnapur

2. पिकासाठी पाणी

पिकाचे नाव	क्षेत्र हे.	आवश्यक पाणी प्रति हे.TCM	एकुण आवश्यक पाणी TCM
मुग	98.00	0.00	0.00
उडिद	90.00	0.00	0.00
सोयाबीन	1230.00	0.15	184.50
मका	99.00	0.00	0.00
तुर	60.00	0.20	12.00
कापुस	1500.00	0.80	1200.00
चारा पिके	21.00	1.00	21.00
गहु	48.00	0.70	33.60
हरभरा	126.00	0.20	25.20
ज्वार	244.00	0.24	58.56
गळीत धान्ये	22.00	0.24	5.28
भाजीपाला	25.00	0.60	15.00
फु लपिके	0.40	0.45	0.18
फळबाग	38.90	4.00	155.60
इतर (ऊस/हळद)	10.20	2.00	20.40
एकुण			1731.32

Figure 5 - Crop water requirement - Pedgaon

requirement is zero because these are kharif crops which require no extra rotations, while Rabi crops like Sorghum or Wheat are shown to need 0.24 and 0.70 TCM/ha water, which are the rotations (extra water) to be given besides water available from soil moisture.

According to Shri. Bhise, these figures are directly taken as per the norms for different crops in different geographical regions from the ICAR handbook

However in the whole report identical crops have different crop-water requirement numbers entered by different Krushi Sahayyaks in different villages. For example, Soyabean crop water requirement for village Singnapur is 0.4 TCM/ha while in Pedgaon it is 0.15 TCM/ha. Similarly, for Wheat it is 0.6 TCM/ha in Singnapur while 0.7 TCM/ha in Pedgaon.

Also, sugarcane figures in Pedgaon are 2 TCM/ha while in Singnapur they are 0.8 TCM/ha. It is not clear whether this is due to use of Drip irrigation in Singnapur or different thumb rules.

For village Hingla, the crop water requirement numbers are very different from above numbers in Pedgaon and Singnapur. Here, there is one more column in the crop water requirement table, called ‘Net Water (TCM)’ which is obtained by multiplying ‘Total water requirement’ by some factor. According to this table, water requirement for Wheat comes out to be 5.5 TCM/ha while for Soyabean it is 0 TCM/ha.

पिकासाठी लागणारे पाणी

पिकाचे नाव	क्षेत्र हे.	आवशक पाणी प्रती हे. TCM	एकूण पाणी TCM	निव्वळ पाणी TCM
कापूस	95	5	475	
सोयाबीन	110	3	330	
मूग	10	3	30	
उडीद	5	3	15	
तूर	5	5	25	12.5
बाजरी	0	3	0	
रब्बी ज्वारी	40	5	200	40
हरभरा	20	4	80	64
करडई	2	3	6	
भुईमूग	0	5	0	0
गहू	5	5.5	27.5	27.5
उस	0	25	0	0
फळबाग	0	8	0	0
हळद	0	5	0	0
आजीपाला/फुले	4	6	24	24
केळी	1	25	25	25
एकूण			1237.5	193

Figure 6 - Crop water requirement - Hingla

It is not clear whether this mismatch is due to changes in local farming practices or due to different methods of calculations used by different Krushi Sahayyaks. Few Krushi Sahayyaks reported that they entered the numbers as per thumb rules and not by consulting farmers.

Thus, it is also important to consult the Krushi Sahayyaks and understand how they have arrived at these numbers. Moreover, the crop-water requirement calculations need to be revisited and some common framework needs to be developed.

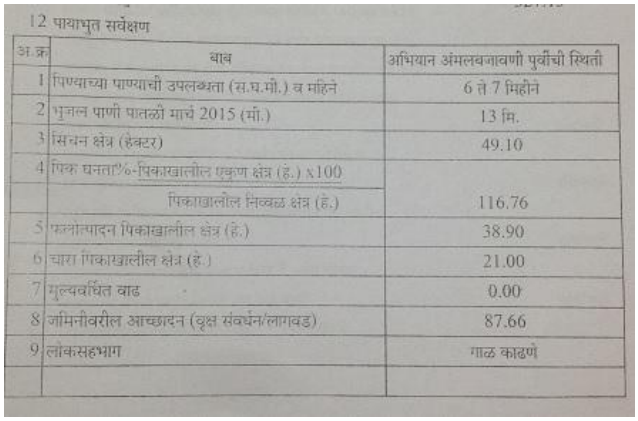
These numbers should also be verified against farmers' irrigation practices to get more realistic crop-water demand. This will also give us more information about how farmers provide the extra water and how they adjust to uncertainties in rainfall.

2) Baseline survey

Based on the format provided in the JYS GR, each village in the report has the baseline survey table consisting of fields like Drinking water availability, number of months drinking water is available, Irrigated area (ha), Crop density, Groundwater level before the project (i.e. in March 2015) etc.

The groundwater level in metres is a single number (for e.g. 14m for Pedgaon) observed in March 2015. But it is not mentioned whether it is the reading in a single (observation) well or average of water table depth in the whole village. If it is a single representative well, the selection of this well and its exact location should be included in the report.

The irrigated area (in hectares) mentioned in the baseline survey tables takes into account only the area under sugarcane and horticulture. For e.g. in Pedgaon the irrigated area as mentioned in the baseline table is 49.1 ha while there is large area under cotton (1500 ha) and Jowar (244 ha) and vegetables (25 ha) and other crops which require irrigation. It is not clear why only sugarcane, horticulture and flowers are treated as irrigated crops.



12 पायाभुत सर्वेक्षण

अ.क्र.	बाब	अभियान अंमलबजावणी पुर्वीची स्थिती
1	पिण्याच्या पाण्याची उपलब्धता (स.घ.मी.) व महिने	6 ते 7 महीने
2	भुजल पाणी पातळी मार्च 2015 (मी.)	13 मि.
3	सिंचन क्षेत्र (हेक्टर)	49.10
4	पिक घनता%-पिकाखालील एकुण क्षेत्र (हे.) x100 / पिकाखालील निव्वळ क्षेत्र (हे.)	116.76
5	फलोत्पादन पिकाखालील क्षेत्र (हे.)	38.90
6	चारा पिकाखालील क्षेत्र (हे.)	21.00
7	मुल्यवर्धित वाढ	0.00
8	जमिनीवरील आच्छादन (वृक्ष संवर्धन/लागवड)	87.66
9	लोकसहभाग	गाळ काढणे

Figure 7- Baseline survey - Pedgaon

3) Sources and methods of irrigation

The extra water (crop water requirement) which farmer has to manage comes from one of the three sources, i) groundwater, ii) surface water – canals (command area) or iii) surface water – lifts (outside command area). Similarly farmer may adopt different methods of irrigation like i) drip, ii) sprinkler or iii) conventional (flow).

The current water balance calculations do not inform the sources and methods of irrigation. The crop table does not have columns for the type like i) command area / non-command area ii) surface water / groundwater irrigation and iii) lift schemes / canal irrigation nor does it have separate columns for different methods of irrigation.

The regions under these different areas, if marked on the revenue map of the village will provide useful information about the needs and types interventions to be designed in different areas.

4) Spatial / Groundwater component in water balance

It is well known that almost 75-80% of the farmers depend on groundwater for irrigating crops. But the water balance takes into account only rainfall runoff as the input to the system while ignoring the rainfall infiltrating below the surface. Thus, the increase in the groundwater table which is available to farmers through open / bore wells is considered as extra water (or irrigation water) to be managed by farmer and not included in water balance. The water levels in the wells depend not only on rainfall, but also on pre-monsoon water levels, hydrogeology of the region and groundwater extraction in the current season. These water levels indicate the water availability to the farmer for that season depending on which farmer decides the cropping pattern. But sometimes cropping pattern may also force the farmer to sink deeper wells in the conditions of poor water availability. Thus, there is a two-way relationship between groundwater availability and cropping pattern which needs to be understood in order to have proper

Figure 8 - Farm well - Singnapur

demand-side management of water, which is an important objective as per the JYS GR. Hence, groundwater use and budgeting needs to be included along with the runoff budgeting in the water balance exercise in JYS.

The main argument of the JYS is that, the storage and impoundment structures created or proposed increase the chances of increasing groundwater storage and make it available for the irrigation. Thus, this impounded water is available to farmers through groundwater recharge which depends on the topography of the village, soil characteristics, aquifer characteristics, current groundwater table depth and so on. Hence the spatial and geological component is very important in estimating the effects of water impoundments.

The spatial component is missing in the current water budgeting. The surface water impounded is directly added numerically to the water balance and thus assumes equal distribution of benefits to all the farms spatially. But a farm adjoining to the structure would be more benefited than a farm far away from it. To visualize this, the locations of the structures and the location of the wells adjoining to the structures should be marked on the revenue maps and displayed in the Gram Panchayat office.

5) Cropping pattern

The agricultural water balance is calculated with the assumption that the existing cropping pattern is the cropping pattern which will remain constant for all years. But crop patterns change due to many reasons like increase in water availability, low rainfall, farmer's affordability etc.

For example, there can be a change in cropping pattern due to increase in water availability due to impoundment structures. The farmers having fields and wells adjoining to these structures (like CNBs and earthern bunds) would get the immediate benefit, and hence can switch to water intensive crops. So the current calculations of crop demand would change and distort the water balance in the future.

The change in cropping pattern due to increased availability of water is not incorporated in the current JYS framework. It does not mention whether an optimal or optimistic or pessimistic crop plan needs to be followed. JYS GR mentions about crop plans and regulations in water use. But there is no provision for agreements or regulations to be done at the village level to bring these things into the plan.

6) GSDA's groundwater assessment and regulations

Groundwater Surveys and Development Agency (GSDA), Maharashtra, performs groundwater budgeting of all the 1500+ watersheds every alternate year. It uses village level data like cropping patterns, extraction of groundwater for irrigation, number of irrigation wells, pumping hours, public drinking water requirements, canal length, command area, conservation structures and so on. The output of the groundwater budgeting is to notify watersheds into Safe, Critical, Exploited and Over-exploited categories. These categories indicate the amount of groundwater extracted in the watershed against the net groundwater availability.

Maharashtra Groundwater (Development and Management) Act, 2009 which was passed in 2013, uses this output of groundwater assessment for regulating the use of groundwater. It mentions some important points like protection of public drinking water sources by delineating area of influence (i.e. the area within which if groundwater is extracted for irrigation purposes, will severely affect the availability of drinking water), designing crop water plans as per the groundwater extraction and availability in the area, banning sinking of wells beyond particular limit in areas where groundwater is depleting rapidly and so on.

JYS GR highlights 'implementation of groundwater act' as an important objective. Current JYS plans neither have the mechanisms to accommodate the outputs of groundwater assessment at village level nor have any interaction with GSDA or the Watershed Water Resources Committee (set up in critical, exploited and over-exploited watersheds under the Act which has powers to regulate groundwater use and design crop plans). Proper interaction and communication with GSDA will give a bigger picture about water balance in the village and will also help in regulating the use in critical, exploited and over-exploited watersheds and protecting the status of safe watersheds.

2.1.2 Recommendations

1) Sample survey of farmers and their irrigation practices at taluka level

The crop water requirement figures are very important in the process of calculating water budget and deficit water for the village. Although there are established norms for crop water requirements developed by ICAR, there seems to be some inconsistency and ambiguity in the current figures for different crops in different villages. There is a need to come up with a consistent framework for the crop-water requirement figures. This framework would be more robust if it reflects actual farming practices in the given region.

A sample survey of local farmers could be conducted for data like timings and number of irrigations applied for different crops, the source of irrigation for different crops in different seasons (i.e. groundwater / surface water through lifts, canal etc.), method of irrigation (drip / sprinkler / flow), cropping decisions in bad and good monsoons, historical cropping data etc.

Table 1 - Crop water sample survey format

Village and farmer name	Crop name	Type	Duration (months)	Acreage (acres)	Source of irrigation	Method of irrigation	No. of irrigations per season	Pumping hours per irrigation	Pump HP
	Muug, Udid, Maka, Cotton, Banana and so on	*Kharif/ rabi/ summer/ horticulture/ Cash crop*			*Canal / lift / groundwater*	*Drip / Sprinkler / Flow*	*In case of canal irrigation, this will indicate no. of rotation*		
. .									

The farmers should be selected so as to cover all the cropping patterns at taluka level. This survey would help in verifying the crop-water figures with the local practices of the farmers and would improve water balance calculations. A sample format for the survey is as shown in Table 1.

2) Marking of all irrigation sources on revenue map

Talathi of the village has information about all the borewells / open wells dug by the farmers. These are linked to the farmers' saat-baaraa forms. This data can be supplemented and used to create farm well inventory of the village. It will have information like location of the well, type, year of construction, its depth, depth to water level at the start of every cropping season etc. Sample format for the same could be as follows –

Table 2 Farm well survey format

Farm well location	Type	Year of construction	Depth (m)	Diameter (m)	Aquifer description	Status	Depth to water level (m)
Latitude, Longitude, Elevation (m)	*Borewell / Open dug well*				*Soil layer (m), murum (m), geru (m) hard rock (m)*	*In use / abandoned / seasonal – month in which goes dry*	*This is monitoring data. Readings to be taken at start of every cropping season*

Last two columns would be monitored at regular intervals while the first six columns would serve as master data. Also, new row would be added to the table by the *talathi* as and when new wells are dug by farmers. Such data would surely improve the well-census data which is currently handled by the Minor Irrigation department.

Data regarding other irrigation sources like canals and lifts should also be maintained. Following formats can be used to maintain the data.

- **Canal name –**
- **Canal length passing through village (m) –**
- **Command area within the village (ha) –**
- **Number of rotations (number of times water was released) in last three years –**

- **Lift irrigation scheme name –**
- **Source location (latitude, longitude, elevation (m) –**
- **Source type (river / pond / MI structure etc.) –**
- **Area covered by the scheme (ha)**

Along with these formats, all the farm wells, the canal, command area under canal irrigation, area under lift irrigation and lift irrigation sources should be marked and mapped on the village map.

This data will help in knowing the extra water (groundwater / canal / lift) availability during the whole year. This would improve the budget calculations and would help in designing and administering crop water plans.

3) Marking zones of influence of conservation structures

The JYS plan assumes that the runoff obstructed by the conservation structures (existing and proposed) would be directly and completely available to farmers as extra water. In reality this water would be available to farmers as increased water levels in their wells. Hence it is important to mark the wells which are expected to benefit by a particular structure. This would create a zone of influence for each structure. For different structures, the zones of influence would be different (e.g. for farm pond it would be one or two farms while a percolation (MI) tank it could be half of the village area).

Figure 9 - Bund at Pedgaon

Figure 10 - Nala deepening at Bhogaon

The zone of influence would depend on many factors –

- Type of the structure (percolation tank / CNB / deepened CNB / graded bunding etc.)
- Dimensions of the structure
- Typical rainfall in the region (mm)
- Terrain (slope, soil characteristics, aquifer depth etc.)

Thus, depending on the above factors, the zones of influence would have different area covered as well as age (i.e. month till which the impounded water lasts). If such zones of influence for the proposed and existing conservation structures are marked on the map, it will be very useful to find regions which are excluded by the interventions. Such regions would then require special treatments.

Similarly, zoning of influence in the design stage would help in finding appropriate location for the structures. This could benefit more area of the village with given funds and interventions.

Such zones of influence should be marked on the revenue map of the village. This would require transferring all the required data to a GIS platform. This would include slope layers, soil depth and type layers, geological layers, groundwater level data, locations and types of structures etc. much of which is available in Integrated Watershed Management Programme (IWMP) plans. Such data and its representation on GIS platform will enable use of groundwater flow simulations in future and will lead to more robustness and better outcomes.

2.2 Drinking water

2.2.1 Findings

In most villages, there was overall scarcity of drinking water. Different sections and parts of the village faced very different drinking water situations, and there coping mechanisms were also very different.

The JYS GR (dated 5-12-2014) recognizes drinking water stress in the villages along with the crop water scarcity and also mentions tackling drinking water stress as an important objective in JYS.

The current planning framework does not parameterize the problem adequately nor does it plan for its solution. The planning format in JYS baseline survey includes column 'Availability of drinking water in the village in LPCD and number of months it is available'. The JYS Parbhani (block) report for 34 villages does not mention the LPCD, but mentions the seasonality aspect. As per this data, no village in the list of 34 villages has year round availability of drinking water. This shows the seriousness of drinking water problem, but the JYS plan does not elaborate on its nature / causes of the problem or its solution.

Also, it is not clear how the data about the seasonality is obtained. The figures also do not tell whether the availability is for the whole village or for certain sections. In villages like Takli and Pedgaon, poorer sections of the village either have to pay more or have to fetch water from long distances. Such data cannot be accommodated in the current JYS plan and hence, is not reflected in the report.

Figure 11 - Queue for drinking water - Takli K.

The public drinking water sources (the traditional wells which are around 30-40 feet deep) in all the villages visited have gone dry. The primary reason seems to be proliferation of private bore wells within the *gavthan* which are deeper (around 70 feet) than traditional wells, rather than poor monsoons. In some villages, some of these private bore wells have also gone dry due to depletion.

In many villages, drinking water schemes are incomplete or have failed. Failure of drinking water schemes and public (traditional) wells has resulted into a dependence on private bore wells or farm wells. This forces the landless and poorer sections of the village to depend on others' private sources for drinking water. In some

cases private drinking water schemes have come up which can be costlier than public schemes.

Groundwater is the common resource for both, irrigation and for domestic use and hence the linkage between groundwater depletion due to more water intensive crops and drinking water stress needs to be understood better.

It is not clear how the JYS interventions will address this problem. JYS planning framework does not contain listing and status of drinking water sources nor does it include data on access and affordability drinking water for all villagers.

2.2.2 Recommendations

Drinking water problem needs to be well formulated to tackle it systematically. This would require describing the problem in detail. Following are various dimensions needed to formulate it –

- Marking of all drinking water sources along with seasonality on the map
- Listing of all drinking water schemes and their status and updating it to NRDWP
- Sruveying and tabulating household-level access and affordability

1) Marking of all drinking water sources (public as well as private) on village gavthan map

It is very essential to know the current status of drinking water availability and access in the village. All the traditional wells should be marked with information about their location (latitude, longitude, elevation), age, depth, diameter, in use or abandoned, if in use - month in which it dries, quality problem if any, number of households depending on this source. Sample format is as follows, and it matches the format used by NRDWP -

Table 3 - Drinking water sources survey format

Location	Type	Depth (m)	Diameter (m)	No. of households depending on this source	If in use – when does it go dry?	Status
Latitude, Longitude, Elevation (m)	*Open dug well, shallow tube well (handpump), deep borewell*				*Month in which well goes dry*	*In use / abandoned / quality affected*

Last two columns are monitoring columns to be filled at regular intervals while first four columns serve as master data.

For other sources like private borewells and farm wells, information like location (latitude, longitude, elevation), year of construction, depth, in use or abandoned, if in use - month in

which it goes dry, quality problem if any, use (private or public without fees or public with fees) can be marked. Sample format is as follows –

Table 4 - Other / private drinking water sources survey format

Source of drinking water	If farm well – dist from hh (m)	Location	Year of construc-tion	Depth (m)	Status	If in use - When does it go dry?	Use
Private bore well / Farm well		*Latitude, Longitude, Elevation (m)*			*In use / abandoned due to quantity / abandoned due to quality*	*Month of year when it goes dry*	*Private / public with fees / public without fees*

Other data like locations and status of handpumps with their depths and months in which they go dry should also be marked and mapped.

Figure 12 - Private connections in Takli K.

Figure 13 - Private connections in Narsapur

2) List of drinking water schemes (public as well as private)

The current status of all the drinking water schemes in the village should also be included in the JYS planning framework. This would include information like year of construction, functional / failed / seasonal, type (piped water supply with house connections / standposts or handpumps or open wells), surface water based / groundwater based, with treatment or not, number of households covered, planned quantity in LPCD, tariff etc.

Table 5 - Public drinking water schemes survey format

Scheme start year	Status	Type	Source	Treatment	No. of households covered	Quantity (LPCD)	Tariff (Rs. / month)
	Functional / Failed / Seasonal / Quality affected	*PWS with house taps / PWS without house taps / handpump /well*	*Groundwater / surface water*	*Non treated / treated with WTP / WTP dysfunctional*		*Litres per capita per day*	

All such formats and data are similar to those used by Water Supply and Sanitation department, Maharashtra and are available on the website of National Rural Development Programme (NRDWP) www.indiawater.gov.in. Figure 14 shows drinking water sources data for the village Singnapur. Similarly, drinking water scheme data is also available with NRDWP.

Habitation Profile (As on date)

Submit your grievance against habitation data shown below

State: MAHARASHTRA	District: PARBHANI	Block: PARBHANI
Panchayat: SINGNAPUR	Village: SINGNAPUR	Habitation: SINGNAPUR

Abstract Data

No. Of Housesholds (As On 01/04/2014)	896		
No. Of Cattles (As On 01/04/2003)	2029		
Total Population (As On 01/04/2014)	GEN - 4580	SC - 355	ST - 14
LPCD As On 01/04/2014	45.02 Litre		
Water Quality Contamination (As On 01/04/2014)	None		
Targeted In 2014-2015	No		
Water Supply Coverage Status As On 01/04/2014	Covered [45.02]		
Water Supply Coverage Status As On Date	Covered [45.02]		

Water Sources Reported

S. No.	Source Type	Source Type Category	Location	Status	Scheme Details						Functionality Status
					Scheme Name - SchemeId	Sanction Year	Est. Cost (Rs. In Lakh)	Rep. Exp (Rs. In Lakh)	Commen. Date	Est. Completion Date	
1	Shallow Tubewell	Ground Water	ZPPS SUGAR FAKTORY SINGANAPUR	Safe	School Water Supply Scheme At Sjngnapur-(0004126828)	2008-2009	0.30000	0.30000	20/05/2008	15/06/2008	Functional
2	Deep Tubewell	Ground Water	NR ANGANWADI DNYANESHWAR NAGAR		SOLAR DUAL PUMP AT SINGNAPUR-(0004759388)	2011-2012	5.22805	4.07782	21/03/2012	28/02/2013	Non Functional Reason : Quantity Date : 01/04/2014

Figure 14 - NRDWP Drinking water data for Singnapur

3) Sample survey of households regarding access and affordability of drinking water

Sample survey of households can be done to get information like distance to drinking water source in different seasons, fees paid etc.

Sampling should be done on the basis of community, geography and land holding. Mini-wards of 30-50 households should be created having a representative (preferably woman) whose contact number and address should be available in the Gram Panchayat office. Women groups like SHGs and landless should be consulted. Sample format is as follows –

Table 6 - Sample household survey for drinking water access and affordability

Household name and Vasti name	Class	Primary source	Distance to primary drinking water source (m)	Month till which primary source lasts	Alternate sources	Distance to alternate sources (m)	Tariff paid (Rs. / year)
main gavthan, dhangar vasti dalit vasti and so on	*Big farmer / marginal farmer / landless / other labour*	*PWS / Handpump / Standpost / well*			*Private borewell / farm well / tanker*		

As per the secondary data obtained from the Census 2011 reports on assets and amenities, there are many villages in Parbhani where the location drinking water source as reported by the villagers is ‘away’, i.e. more than 500m away from the house. Also lot of population

seems to depend on handpumps and uncovered wells for drinking water. Such data needs to be incorporated while selecting JYS villages and while planning for the interventions in the JYS selected villages.

9	10	72	73	74	75	76	77	78	79	80	81	82	83	84
Area Name	Rural/ Urban	Main Source of Drinking Water										Location of drinking water source		
		Tapwater from treated source	Tapwater from un-treated source	Covered well	Un-covered well	Handpump	Tubewell/ Borehole	Spring	River/ Canal	Tank/ Pond/ Lake	Other sources	Within premises	Near premises	Away
9	10	72	73	74	75	76	77	78	79	80	81	82	83	84
Nagapur	Rural	0	0	0	93.4	6.6	0	0	0	0	0	6.6	0	93.4
Samsapur	Rural	1.5	0	0	98	0.5	0	0	0	0	0	1	11.2	87.8
Satla	Rural	12.2	66.3	0	7.3	0	14.1	0	0	0	0	12.2	1	86.8
Dhar	Rural	2	2	0.5	0.5	92	2.5	0	0.5	0	0	7.5	10.1	82.4
Hasnapur	Rural	0	0	0	0	100	0	0	0	0	0	2.1	19.1	78.7
Pingli kothala	Rural	0	0	0.5	0	98.6	0.9	0	0	0	0	18	8.1	73.9
Nandapur	Rural	2.2	10.2	0	1.2	82.2	3.9	0	0	0	0.2	14.1	14.9	71
Dafwadi	Rural	0	0	0	0	98.6	1.4	0	0	0	0	10	20	70
Bramhapuri tarf pathri	Rural	7.9	4.4	1.9	31.3	22.9	30.5	0	0.4	0.1	0.5	6.3	24.7	69
Govindpur	Rural	19.2	52.9	0	26	0	1	0	0	0	1	1	39.4	59.6
Karadgaon	Rural	0	23.2	1.8	22.6	52.4	0	0	0	0	0	21.4	19.6	58.9
Narsapur tarf parbhani	Rural	70	1.4	0	0	14.1	14.5	0	0	0	0	26.8	16.8	56.4
Takli kumbhakarna	Rural	6.2	66.4	2.1	5.8	9.8	9.5	0.1	0	0	0	18.5	27.6	53.9
Bhogaon	Rural	0	10.6	0	11.9	76.8	0.7	0	0	0	0	8.9	38.8	52.3
Sukapurwadi	Rural	11.5	14.1	3.8	5.1	62.8	0	0	0	0	2.6	16.7	32.1	51.3
Sanpuri	Rural	14.8	40.3	0	0	44.3	0.6	0	0	0	0	5.5	44	50.5
Sahajpur	Rural	1	0	1	6.1	88.8	3.1	0	0	0	0	9.2	41.8	49
Sonna	Rural	15	2.3	1.7	9.8	67.1	3.7	0	0.3	0	0	39.2	15.9	45

Figure 15- Fraction of population using different souces of drinking water and different locations

4) Interventions for strengthening drinking water sources

NRDWP keeps 20% funds for source sustainability i.e. strengthening of drinking water sources which go dry, or are seasonal. These works are implemented by GSDA. Works like well recharge, recharge shafts, subsurface bunds, fracture cementation etc. are included under this component. In Parbhani, GSDA is currently has planned to implement recharge shafts in 87 villages. The impact of such interventions varies with terrain and geology and they must be carefully monitored and documented through measuring of increased water levels in the wells, rainfall in that season along with intensity, interviews with people, their perception about the impact etc. Proper documentation and description of these interventions and their impacts along with marking of these structures on the GIS platform, along with other layers like groundwater potential layers, soil depth layers, slope layers etc. would lead to more knowledge about the working and impact of these structures.

2.3 Drinking water quality

2.3.1 Findings

Water quality although not mentioned directly in JYS, is a critical element in access to drinking water. In most of the villages visited, villagers reported the problem of water quality. In all these villages, according to villagers, one part of the village (generally the downstream part) was affected by salinity while groundwater in the other part is fresh. This problem needs to be understood properly and the reason for the salinity needs to be tracked. This may be natural (as predicted by villagers), or it may be contaminated due to poor

sanitation practices and lack of sewage infrastructure in the villages or due to leaching of fertilizers from farms. One village reported the kidney-related problems.

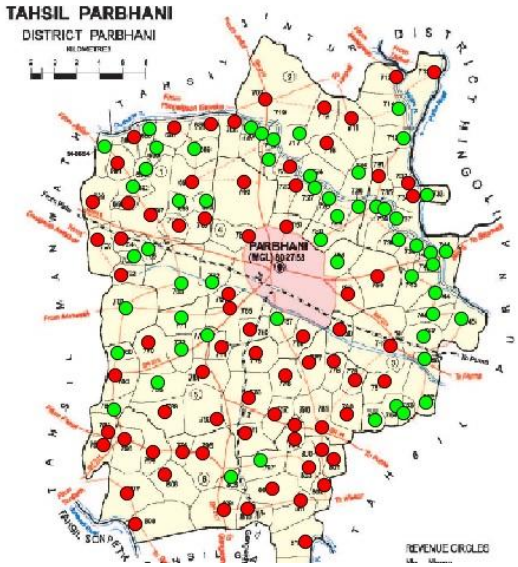


Figure 16 – Red dots are Nitrate affected villages in Parbhani block (NRDWP data)

According to National Rural Drinking Water Programme (NRDWP) data on water quality (collected at regular intervals by Jalsurakshaks in the villages and tested at Public Health Department Labs), many villages in Parbhani block are affected by Nitrates. Figure 16 shows the nitrate affected villages in Parbhani block. Figure 17 shows the detailed Nitrate report of Singnapur village.

National Rural Drinking Water Programme

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You are here : Home > Water Quality > Format E1- Sources contaminated with selected parameters

Financial Year 2014-2015 | State MAHARASHTRA | District PARBHANI | Block PARBHANI | Panchayat SINGNAPUR
Village All Village | Habitation All Habitation | Parameter Type Mandatory | Parameter Name Nitrate | Show

1

Format E1- Sources found with Nitrate above permissible limit(2014-2015)

S. No.	State	District	Block	Panchayat	Village	Habitation	Location	Type Of Source	Lab Name	Testing Date	Above Permissible Limit	Sample Numbe
1	MAHARASHTRA	PARBHANI	PARBHANI	SINGNAPUR	SINGNAPUR	SINGNAPUR	PWS WELL VILLAGE NEAR ODHA,/PU0001076484	Openwell	Dist Public Helth Laboratory	29/12/2014	Nitrate[92.64 Mg/L]	PBN-312
2	MAHARASHTRA	PARBHANI	PARBHANI	SINGNAPUR	SINGNAPUR	SINGNAPUR	NEAR MAROTI MANDIR,/PU0001076487	Shallow Tubewell	Dist Public Helth Laboratory	29/12/2014	Nitrate[83.10 Mg/L]	PBN-309
3	MAHARASHTRA	PARBHANI	PARBHANI	SINGNAPUR	SINGNAPUR	SINGNAPUR	BUS STAND NEAR,/PU0001076502	Shallow Tubewell	Dist Public Helth Laboratory	29/12/2014	Nitrate[84.38 Mg/L]	PBN-314
4	MAHARASHTRA	PARBHANI	PARBHANI	SINGNAPUR	SINGNAPUR	SINGNAPUR	SAKHARAM KADAM HOUSE NEAR,/PU0001076504	Shallow Tubewell	Dist Public Helth Laboratory	29/12/2014	Nitrate[92.14 Mg/L]	PBN-313
5	MAHARASHTRA	PARBHANI	PARBHANI	SINGNAPUR	SINGNAPUR	SINGNAPUR	NEAR BAUDH WADA,/PU0001218427	Shallow Tubewell	Dist Public Helth Laboratory	29/12/2014	Nitrate[81.42 Mg/L]	PBN-310
6	MAHARASHTRA	PARBHANI	PARBHANI	SINGNAPUR	SINGNAPUR	SINGNAPUR	NEAR SOGE GALLI,/PU0001233167	Shallow Tubewell	Dist Public Helth Laboratory	29/12/2014	Nitrate[86.14 Mg/L]	PBN-311

* Mandatory Parameters are Alkalinity, Arsenic, Chloride, Fluoride, Iron, Nitrate, pH and TDS(Saliniy).
* Other than Mandatory Parameters.

Figure 17 - Nitrate contamination report - Singnapur

2.3.2 Recommendations

1) Testing of water samples from drinking water sources

NRDWP maintains and updates this water quality data for all villages in Maharashtra. They have habitation-wise and contamination-wise water quality data of all drinking water sources.

The data can be accessed at http://indiawater.gov.in/imisreports/Reports/WaterQuality/rpt_WQM_ContaminationWiseLabTesting_S.aspx?Rep=0&RP=Y. Water quality of all drinking water sources in a village for all biological as well as mineral parameters at regular intervals (different testing intervals for biological and mineral parameters are followed) is maintained and updated. These data formats and the actual data needs to be incorporated in the JYS framework to parameterize the water quality problem in better way.

NRDWP quality data is only for the drinking water sources in gavthan area of the village. It does not cover the farm wells which are used for drinking water. It also does not cover the private bore wells. Thus, there should be some sample survey done to delineate the regions with different quality problems.

2) Investigation of the source of contamination

Although people in almost all the villages report the problem of salinity in some drinking water wells in the gavthan area, the source of this problem is not clear. This needs further investigation, because some people claim this to be natural problem while prima-facie it seems to be problem caused by lack of sanitation infrastructure and open gutters.

Proper description of the problem (exact location, elevation and depth of wells / private bore wells having salinity, locations of areas used for defecation, locations of water logged areas during monsoons etc.) will be necessary in order to find out the root source of contamination. If the water quality data (available with NRDWP) for a particular region is mapped and put on a GIS platform along with other layers like slope maps, land use maps, drainage maps etc., it would help in tracking the reasons and sources of contamination.

2.4 Policy and implementation

1) Awareness about JYS

In 2 villages (Nagapur and Narsapur), people were not aware of the JYS and did not know about the Gram Sabha held for the same. Wherever people knew about the JYS, they did not know about its objectives. They did not know about their village's water balance though some of them knew about the interventions proposed.

It is important that along with the JYS promotion-vehicle travelling to villages, village maps showing all the proposed and existing interventions should be displayed in the Gram Panchayat office and schools. Along with this, the deficit water calculated from water balance exercise should also be displayed. This would force discussions and analysis among people and would bring more robustness in the design and planning framework.

2) Some implementation issues

In Nagapur, a farmer who had his field adjoining to a Cement Nala Bund had removed the gate, because of which the bund is rendered useless and stream remains dry. The stream is now used as the road by other farmers to go to their fields. The reason which farmer reported

for removing the gates is that if the bund is filled with water, farmers would walk through his field. The farmer also feared that due to impoundment his field will be encroached. There is a drinking water well close to this bund and downstream. This well would surely be benefited if the bund holds water.

In the same village, inspite of having good locations for building bunds on the stream, the Krushi Sahayyak reported that intervention cannot be done because, as per the norms the width of the stream is too small to have such intervention. But by looking closely and by talking to local farmers it is clear that the stream has been encroached over the years by the adjoining fields. Hence, if the stream and fields are demarcated accurately, according to 7-12 land records and revenue maps, the true width of the stream would be revealed. Similar instance was also reported in Bhogaon.

Maps showing exact boundaries available with *talathi* and land records department should be used to settle such disputes.

2.5 Village-wise summary table

Following is a summary table showing some important figures for each of the villages visited.

Table 7 - Village-wise Summary table

Name	Population	Is SC dominated?	Area (ha)	Is JYS village?	Total water demand (TCM)	Runoff impounded by existing + proposed structures (TCM)	Water balance (TCM)	Dist to dr. water source more than 500m (% population)	Pvt dr. water schemes present	Quality prob. as per NRDWP
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Pedgaon	11757	N	3226.5	Y	1997.49	2057.72	60.23	37%	Y	Y
Bhogaon	2350	N	1103.6	Y	784.25	955.7	171.45	52.3%	N	Y
Takli Kumbhakarna	7045	N	-	N	-	-	-	53.9%	Y	Y
Singnapur	5016	N	1640	Y	1343.75	975.33	-368.42	41.9%	-	Y
Narsapur	1343	N	397	Y	250.9	74.06	-176.84	56.4%	Y	N
Nagapur	613	Y	394	Y	257.19	35.05	-222.14	93.4%	N	Y

Data for columns 2, 4, 5, 6, 7 and 8 is taken from the baseline report for all JYS villages in Parbhani block. Columns 2 and 9 data is taken from Census 2011 village-wise data of assets and amenities. Column 10 data is as per the preliminary discussions with people in the village, and needs to be further verified in detail. Column 11 is taken from NRDWP reports of habitation-wise chemical-contamination testing of drinking water sources.

3. Broader suggestions

3.1 Representation on GIS platform

Proper description of the situation is one of the most important first steps for any programme to succeed. This requires representation and proper analysis of all the relevant data. This demands for proper data collection of various parameters like terrain, soil, geology, rainfall, wells, crops, quality and so on, in order to tackle the problem of water security.

In order to have proper representation and analysis, this data needs to be transported to GIS platform. JYS GR (dated 5-12-2014) mentions the importance and use of GIS in planning and representation.

Currently most of the data like soil, geology, land use etc. is available with MRSAC as GIS shape files at village level. MRSAC shares this data with the concerned departments like agriculture, GSDA etc. But this data is not easily available in the public / academic domain. These GIS layers can be very useful in understanding the nature and causes of drinking water scarcity, quality problems, impact of conservation structures etc. Use of GIS also makes available different maps like drinking water stress maps, quality affected areas maps, sugarcane belts, poor groundwater belts etc. Such maps would serve two purposes; i) maps convey more information than tables and reports, hence villagers will become more aware and ii) these maps give further direction in understanding the problem better.

3.2 Interaction and coordination between departments

Proper representation of data on GIS platform requires integration of data from different departments. Different datasets like revenue and land use data from Revenue department, crop data from Agriculture department, canal and command area data from Water Resources department, groundwater assessment data from GSDA, conservation structures data from Soil conservation department, watershed data from IWMP (Agriculture department), drinking water data from Water Supply and Sanitation department etc. has to be brought to one place for correct analysis and formulation of the problem. This requires proper integration and communication between all these departments. JYS GR mentions this as a requirement while preparing all the village plans. But there is no clear provision and room to make such interaction and communication in the village planning framework. Village plans talk about financial convergence between various departments and programmes, but this needs to be extended to convergence of data, capacities and so on.

3.3 Groundwater modelling and simulations

Some complex problems might require more research and analysis and use of tools such as groundwater modelling for greater understanding of the problem. For example, finding suitable areas for interventions like *nala*-deepening would include understanding of the geology, aquifer characteristics and groundwater flows. Similarly, impact of recharge shafts or identification of source of contamination of drinking water in villages etc. can be carried out by using groundwater modelling and simulations. Proper representation of the required

data on GIS platform would make use of such tools easier and more reliable. A suite of such simulations will help in designing JYS better.

4. About CTARA – past and ongoing work

CTARA has been working on the problems of drinking water security and livelihood water security for last several years. The work includes failure analyses of drinking water schemes, design of multi-village drinking water schemes, analysis and design of monitoring and evaluation framework for drinking water schemes, livelihood water security and watershed planning in hilly watersheds, analysis of watershed programmes like IWMP, impact analyses of watershed interventions using groundwater modelling and simulations, analysis of GSDA observation well data of last 30 years, analyses of various policy documents and institutions, study of district planning processes and so on. Although most of the work has been concentrated in the adjoining districts of Thane and Raigad, CTARA is looking forward to work on water security problems in the Marathwada region. One such project is the analysis of Water supply scheme of Parbhani town.

The work has always involved interactions with people, government officials and departments, non-governmental organizations and various practitioners working in water sector. This has created a large body of understanding in the field of water security in rural areas. For detailed reports on above topics, please refer to following links –

www.cse.iitb.ac.in/sohoni~/water

www.ctara.iitb.ac.in/water

www.ctara.iitb.ac.in/tdsc

APPENDIX - JYS Village Plan format

पाणी सर्वासाठी - टंचाईमुक्त महाराष्ट्र २०१९
अंतर्गत
जलयुक्त शिवार अभियान
गावाचा आराखडा

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१. गावाचे नाव - (अक्षांश - , रेखांश -) ता. जि.

२. गावाचे भौगोलिक क्षेत्र - हेक्टर ,

३. गावाची एकुण लोकसंख्या -

४. गावातील अ) जनावरांची संख्या - ब) शेळ्या व मेंढ्या - क) कुक्कुट पक्षी -

५. सुक्ष्म पाणलोट संख्या - क्षेत्र - हेक्टर

६. गावाचे सरासरी पर्जन्यमान - मि.मी. पावसाचे एकुण दिवस -

७. **गावाच्या निवडीसाठी वापरलेले निकष -**

- एकात्मिक पाणलोट व्यवस्थापन कार्यक्रम/विदर्भ सघन सिचन विकास कार्यक्रम/नाबार्ड पायाभुत निधी पाणलोट विकास निधी/ पश्चिम घाट विकास कार्यक्रम/गतिमान पाणलोट विकास कार्यक्रम/नदी खोरे प्रकल्प / राष्ट्रीय पाणलोट विकास कार्यक्रमातुन ५० टक्के पेक्षा जास्त पुर्ण पाणलोट क्षेत्रात/फोरडयाहु शेती अभियानात गावाचा समावेश आहे काय ? होय/नाही
- या वर्षी टंचाई घोषीत गाव (५० पेक्षा कमी पैसेवारी)/ गेल्या ५ वर्षात टंचाई घोषीत गाव आहे काय ? होय/नाही
- टँकरने पाणी पुरवठा होणारे/गेल्या ५ वर्षात एकदा तरी टँकरने पाणी पुरवठा होणार गाव आहे काय ? होय/नाही
- अति शोषित (Over Exploited)/Critical/Semi Critical पाणलोटातील गाव आहे काय ? होय/नाही
- पाणलोट मंजूर असलेले गाव/ तसेच गेल्या ५ वर्षात किमान एकदा तरी टंचाई घोषीत केलेली गाव आहे काय ? होय/नाही

(**टिप** - नको असलेला मजकुर खोडावा)

८. पिकाखालील एकुण क्षेत्र - हेक्टर

अ) खरीप हंगामातील पिकांचे एकुण क्षेत्र - हेक्टर

अ.क्र.	पिकाचे नाव	क्षेत्र (हेक्टर)	अ.क्र.	पिकाचे नाव	क्षेत्र (हेक्टर)
१	मुग		६	चारा पिके	
२	उडिद		७		
३	सोयाबिन		८		
४	मका		९		
५	तुर		१०		

ब) रब्बी हंगामातील पिकांचे एकुण क्षेत्र - हेक्टर

अ.क्र.	पिकाचे नाव	क्षेत्र हेक्टर	अ.क्र.	पिकाचे नाव	क्षेत्र हेक्टर
१	गहु		६	चारा पिके	
२	हरभरा		७		
३	र.ज्वारी		८		
४	गळीतधान्ये		९		
५	मका		१०		

क) उन्हाळी हंगामातील पिकांचे एकुण क्षेत्र - हेक्टर

अ.क्र.	पिकाचे नाव	क्षेत्र हेक्टर	अ.क्र.	पिकाचे नाव	क्षेत्र हेक्टर
१	भुईमुग		३		
२	चारा पिके		४		

ड) एकुण नगदी पिके - हेक्टर

अ.क्र.	पिकाचे नाव	क्षेत्र हेक्टर	अ.क्र.	पिकाचे नाव	क्षेत्र हेक्टर
१	ऊस		३		
२	कापुस		४		

इ) एकुण फळ पिके - हेक्टर

अ.क्र.	पिकाचे नाव	क्षेत्र हेक्टर	अ.क्र.	पिकाचे नाव	क्षेत्र हेक्टर
१	डाळींब		५	सिताफळ	
२	द्राक्ष		६	अंजिर	
३	केळी		७	आंबा	
४	पपई		८		

ई) एकुण भाजीपाला पिके - हेक्टर

अ.क्र.	पिकाचे नाव	क्षेत्र हेक्टर	अ.क्र.	पिकाचे नाव	क्षेत्र हेक्टर
१	कांदा		३		
२	वांगी		४		

फ) एकुण फुल पिके - हेक्टर

अ.क्र.	पिकाचे नाव	क्षेत्र हेक्टर	अ.क्र.	पिकाचे नाव	क्षेत्र हेक्टर
१	झेंडु		३		
२	निशीगंध		४		

९. गावाचा पाण्याचा ताळेबंद

अ. पावसापासुन मिळणारा अपधाव - TCM

अ. क्र.	पाणलोटाचा प्रकार	क्षेत्र हे.	स्ट्रॅंज तक्त्याप्रमाणे अपधाव %	मिळणारा प्रती हे. अपधाव TCM	एकुण अपधाव TCM
१	उतार - २० टक्के पेक्षा जास्त				
२	उतार — १ ते २० टक्के				
३	उतार - १ टक्के पेक्षा कमी				
	एकुण				

ब. गावाची एकुण पाण्याची गरज (१ + २) - TCM

१. पिण्याचे पाणी

पिण्यासाठी पाणी			
गाय	संख्या	प्रति दिन लिटर	एकुण आवश्यक पाणी TCM
माणसे		११	
जनावरे		३१	
शेळ्या मेंढ्या		१	
एकुण			

२. पिकासाठी पाणी

पिकाचे नाव	क्षेत्र हे.	आवश्यक पाणी प्र.हे. TCM	एकुण आवश्यक पाणी TCM
बाजरी			
मका			
रब्बी ज्वारी			
गहू			
भुईमुग			
फळबाग			
एकुण			

क) गावातील जलसंधारण कामामुळे अडविलेला अपधाव (पावसाचे पाणी)

कामाचा प्रकार	जुनी कामे		नवीन प्रस्तावित कामे		एकुण	
	संख्या/हे.	TCM	संख्या/हे.	TCM	संख्या/हे.	TCM
सलग समतल चर						
कंपार्टमेंट बंडींग						
माती नालाबांध						
सिमेंट नाला बंधारा						
वाहुर तलाव						
शेततळे						
एकुण						

ड) गावासाठी पाण्याचा ताळेबंद

१. गावाची एकुण पाण्याची गरज - TCM

- पिकासाठी - TCM
- पिण्याचे पाण्यासाठी - TCM

२. पावसाचे पाण्यापासुन मिळणारा एकुण अपधाव - TCM

३. जलसंधारण कामामुळे एकुण अडविलेला अपधाव - TCM

- पुर्वी झालेल्या कामामुळे - TCM
- नवीन प्रस्तावित कामामुळे - TCM

४. गावाचे गरजेच्या तुलनेत जास्त/कमी - TCM

५. निव्वळ वाहुन जाणारा अपधाव - TCM

१०. हाती घ्यावयाची मंजुर व नवीन कामे आणि निधी तपशील

अ. मंजुर असलेल्या योजनेंतर्गत कामे पुर्ण करणे

अ.क्र.	कामाचे नाव	कामे संख्या/ हेक्टर	उपलब्ध निधी रु.लाखा	शासकीय योजनेचे नाव
१	पाणलोट कामे			
अ.	कंपार्टमेंट /ट्रेंचेस बंडींग			
ब.	खोल सलग समतल चर/सलग समतल चर			
क.	मातीचे नाला बांध			
ड.	शेततळे			
इ.	मातीचे लहान बांध			
ई.	अनघड दगडी बांध			
फ.	गॅबियन बंधारा			
२	सावळी सिमेंट कॉक्रीट नाला बांध खोलीकरण व रुंदीकरणासह			
३	जुन्या संरचनांचे पुनर्जिवन करणे			
४	अस्तित्वातील लघु पाटबंधारे संरचनाची (के.टी. वेअर /साठवण बंधारा) दुरुस्ती करणे			
५	पाझर तलाव लघु सिंचन तलाव दुरुस्ती,नुतनीकरण व क्षमता पुनर्स्थापित करणे			
६	पाझर तलाव/गाव तलाव/साठवण तलाव/शिवकालीन तलाव/ब्रिटीशकालीन तलाव / माती नाला बांधातील गाळ काढणे			
७	ओढा/नाला जोड प्रकल्प राबविणे			

८	विहीर/ बोअर वेल पुनर्भरण कामे			
९	उपलब्ध पाण्याचा कार्यक्षम वापर (ठिबक तुषार सिंचन)			
१०	पिण्याच्या पाण्याचे स्तोत्र बळकटीकरण करणे			
११	कालवा दुरुस्ती			
१२	मध्यम व मोठ्या प्रकल्पांची सिंचन क्षमतेनुसार वापर होणेसाठी उपाययोजना करणे			
	एकुण			

ब. नव्याने हाती घ्यावयाची कामे

अ.क्र.	कामाचे नाव	कामे संख्या/ हेक्टर	आवश्यक निधी रु.लाख	शासकीय योजनेचे नाव
१	**पाणलोट कामे**			
अ.	कंपार्टमेंट /प्रेडेड बंडींग			
ब.	खोल सलग समतल चर/सलग समतल चर			
क.	मातीचे नाला बांध			
ड.	शेततळे			
इ.	मातीचे लहान बांध			
ई.	अनघड दगडी बांध			
फ.	गॅबियन बंधारा			
२	सावळ्यी सिमेंट कॉक्रीट नाला बांध खोलीकरण व रुंदीकरणासह			
३	जुन्या संरचनांचे पुनर्जिवन करणे			
४	उपलब्ध पाण्याचा कार्यक्षम वापर (ठिबक तुषार सिंचन)			
५	पिण्याच्या पाण्याचे स्तोत्र बळकटीकरण करणे			
६	कालवा दुरुस्ती			
७	मध्यम व मोठ्या प्रकल्पांची सिंचन क्षमतेनुसार वापर होणेसाठी उपाययोजना करणे			
	एकुण			

क. अस्तित्वातील जलस्तोत्रांची दुरुस्ती व बळकटीकरण करणे, गाळ काढणे

अ.क्र.	कामाचे नाव	कामे संख्या/ हेक्टर	आवश्यक निधी रु.लाखा	शासकीय योजनेचे नाव
१	अस्तित्वातील लघु पाटबंधारे संरचनाची (के.टी. बेअर /साठवण बंधारा) दुरुस्ती करणे			
२	पाझर तलाव/लघु सिंचन तलाव दुरुस्ती,नुतनीकरण व क्षमता पुनर्स्थापित करणे			
३	पाझर तलाव/गाव तलाव/साठवण तलाव/शिवकालीन तलाव/ब्रिटीशकालीन तलाव / माती नाला बांधातील गाळ काढणे			
४	ओढा/नाला जोड प्रकल्प राबविणे			
५	विहीर/ बोअर वेल पुनर्भरण कामे			
६	पिण्याच्या पाण्याचे स्तोत्र बळकटीकरण करणे			
	एकुण			

ड. अशासकीय संस्थेद्वारे करावयाची कामे

(खाजगी व सहकारी साखर कारखाने/देवस्थान समिती/ ट्रस्ट/स्वंयसेवी संस्था/क्लब्ज इ.)

अ.क्र.	कामाचे नाव	कामे संख्या/ हेक्टर	आवश्यक निधी रु.लाखा	अशासकीय संस्थेचे नाव
१	खोल सलग समतल चर खोदणे			
२	सिमेंट क्रॉकीट नाला बांध नाला खोलीकरण/रुंदीकरणासह			
३	अस्तित्वातील लघु पाटबंधारे संरचनाची (के.टी. बेअर /साठवण बंधारा) दुरुस्ती करणे			
४	गाळ काढणे (पाझर तलाव/गाव तलाव/साठवण तलाव/शिवकालीन तलाव/ब्रिटीशकालीन तलाव / माती नाला बांध)			
५	ओढा/नाला जोड प्रकल्प राबविणे			
६	पिण्याच्या पाण्याचे स्तोत्र बळकटीकरण करणे			
	एकुण			

९. खाजगी उद्योग सामाजिक उत्तरदायीत्व निधीतुन (CSR) करावयाची कामे

अ.क्र.	कामाचे नाव	कामे संख्या/ हेक्टर	आवश्यक निधी रु.लाख	खाजगी उद्योगाचे नाव
१	खोल सलग समतल चर खोदणे			
२	सिमेंट क्रॉकीट नाला बांध नाला खोलीकरण रुंदीकरणासह			
३	अस्तित्वातील लघु पाटबंधारे संरचनाची (के.टी. बेअर /साठवण बंधारा) दुरुस्ती करणे			
४	गाळ काढणे (पाझर तलाव/गाव तलाव/साठवण तलाव/शिवकालीन तलाव ब्रिटीशकालीन तलाव / माती नाला बांध)			
५	ओढा/नाला जोड प्रकल्प राबविणे			
६	पिण्याच्या पाण्याचे स्तोत्र बळकटीकरण करणे			
	एकुण			

११. निधीचा गोषवारा

अ.शासकीय

१. मंजुर निधी (अ तक्ता) - रु. लाख

२. आवश्यक निधी (ब आणि क तक्ता) - रु. लाख

एकुण शासकीय निधी - रु. लाख

ब. अशासकीय संस्थाकडुन उपलब्ध होणारा निधी - रु. लाख

क. खाजगी उद्योगाकडुन (CSR) उपलब्ध होणारा निधी - रु. लाख

एकुण निधी - रु. लाख

१२.पायाभुत सर्वेक्षण

अ.क्र.	बाब	अभियान अंमलबजवणीपुर्वीची स्थिती
१	पिण्याच्या पाण्याची उपलब्धता (स.घ.मी.)व महिने	
२	भुजल पाणी पातळी मार्च २०१५ (मी.)	
३	सिंचन क्षेत्र (हेक्टर)	
४	पिक घनता % पिकाखालील एकुण क्षेत्र (हे.) x १०० पिकाखालील निव्वळ क्षेत्र (हे.)	
५	फलोत्पादन पिकाखालील क्षेत्र (हे.)	
६	चारा पिकाखालील क्षेत्र (हे.)	
७	मुल्यवर्धित वाढ	
८	जमिनीवरील आच्छादन (वृक्ष संवर्धन/लागवड)	
९	लोकसहभाग	

प्रमाणपत्र

प्रमाणित करणेत येते की, पाणी सर्वासाठी - टंचाईमुक्त महाराष्ट्र २०१९ अंतर्गत जलयुक्त शिवार अभियान अंमलबजावणीसाठी मौजे - ता. जि. या गावाची निवड जिल्हा समितीने केली आहे. गावात जलयुक्त शिवार अभियान अंतर्गत हाती घ्यावयाची कामे शासन निर्णयात दिलेल्या सुचनाप्रमाणे सरपंच, ग्रामपंचायत सदस्य, तलाठी, ग्रामसेवक, कृषि सहाय्यक, कृषि पर्यवेक्षक,शाखा अभियंता/कनिष्ठ अभियंता यांनी गावात दि. / / २०१४ रोजी शिवार फेरी करुन निश्चित केली आहेत. गावामध्ये हाती घ्यावयाच्या सर्व कामासाठी एकुण र.रु. लाख निधीची आवश्यकता आहे त्यापैकी र.रु. लाख निधीची कामे लोकसहभागातुन हाती घेणेत येणार आहेत. उर्वरीत कामे शासकिय निधी/अशासकीय संस्थाकडील निधी/खाजगी उद्योगाकडील सामाजिक उत्तरदायित्व निधीतुन पुर्ण करणेची आहेत.

गावात जलयुक्त शिवार अभियानंतर्गत हाती घ्यावयाच्या कामाच्या आराखड्यास ग्रामसभा ठराव क्रं. दि. / / २०१४ अन्वये मान्यता घेतलेली आहे.

दि. / / २०१४

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