FES

FOUNDATION FOR ECOLOGICAL SECURITY

Crop Water Budgeting Tool

(Android based Application)

User Manual

Users' Manual on Android Based Crop Water Budgeting Tool (Application)

Crop Water Budgeting is a tool developed to assist communities for the proper management of water resources. It is a farmer-centric tool that assists in creating the support system needed for village communities to balance demand with supplies, so that water consumption does not exceed the limits of recharge through rainfall, stream flows and surface water storage.

The Crop Water Budgeting (CWB) tool has been developed to assist communities manage their surface and ground water efficiently without further depleting their resources. While working towards improving the supply of water, the effort is to build awareness about efficient demand side management. This includes assisting village communities to gain an understanding of the current crisis relating to water in farming systems, water as a Commons, techniques and technologies for water saving, policies and programmes related to water, as well as undertaking CWB exercises (including conservation and recharge) with farmers to elicit collective action for judicious use of available water.

Farming communities are at the centre of CWB exercises because water availability, whether groundwater or surface, is deeply impacted by their actions, and in turn the availability impacts their livelihoods. The CWB exercises open up spaces for farmers to

come together and examine their actions, discuss collectively and arrive at options that would be helpful to the entire community on the long run.

Tools and Technologies

With a view to ease the estimation of water availability & requirement for the Rabi season, an android based application i.e. CWB tool has been developed which can be downloaded and installed on any android mobile or tablet for enabling facilitators/ Village Agriculture Workers (VAWs)/ and Community Resource Persons (CRP) to input primary information related to rainfall, number of wells, water harvesting structures, drains, cropping pattern etc. Depending on the input data, the tool calculates the availability of water for the crops after deducting the water requirement for domestic purposes. On the basis of balance situation of water, there is debate & discussions amongst the community and depending upon the water availability for the Rabi season, the community members discuss possible crops/ varieties/ practices etc. to cop- up with the water situation. The exercise generates debate and discussion on water as a collective resource and the need for better governance.

Key Activities

At its core, CWB is designed as a farmer-friendly and farmer-centric tool for collective decision making. Preparation for CWB involves the VAWs & CRPs along with community members collecting data such as an inventory of existing water bodies and a census of open & bore wells, availability of surface water, documenting groundwater levels and changes across seasons and subsequent years, crops grown during Kharif and Rabi and the area treatment measures undertaken in their village boundary. The data collected are then evaluated against the scientific norms set by various agencies to estimate the water availability and water use.

Once the farmers' plans for the forthcoming Rabi season have been collected, a community level workshop is organised for the CWB exercise. Water availability for the season is evaluated based on the recharge potential of the area by taking into consideration rainfall levels and water storage in the surface structures. This is matched against the water required for cultivation in Rabi season based on the farmers' plans. This is followed by community discussions on balancing the demand and supply side of water, aided by the facilitators providing more information on alternative crops, cropping practices and improved techniques and technology for saving water with higher returns from crop production.

The activities under supply side management include means to increase the availability of water, constructing bunds, farm ponds, percolation tanks, check-dams etc. Demand side management includes regulating the use of water, and requires a great deal of proactive involvement from the farming community as it hinges on their regulation of water used for agricultural purposes. It involves convincing farmers to adopt water saving technologies, change cropping pattern, varietal change, etc.

Based on water availability, farmers are expected to make changes in the crops to be cultivated, practices to be followed and adopt new technologies. The community level deliberations involve developing an understanding of issues related to farming practices, and how one variable impacts the other in a causal loop. A holistic view is developed where a diverse set of parameters, including variables influencing soil productivity (soil fertility, soil erosion, degradation, soil moisture, green manure etc.), factors influencing crop choice (market, domestic need, cropping rotation, yields etc.), irrigation practices (traditional, technology based etc.), water resources (water harvesting structures etc.), pest and diseases, fertilizers, and drought, are considered.

Along with the discussions on demand side management of water, the community members are informed of various programmes, such as watershed development and National Rural Employment Guarantee Act (NREGA), which can be used to augment their water resources. They are also informed about policy provisions related to managing water as common pool resources, provisions supporting and restricting the use of surface and ground water and finally impressing the need for operationalization of the clauses that can determine long term impacts. The commonly agreed decisions are recorded and monitored at community level.

Impact

The benefits of adopting CWB as a water management tool include an increase in the awareness level among farmers on water resources, use of water saving devices or improved irrigation systems such as drip irrigation, sprinklers etc., sharing of water resources between farmers with lands close by, possible switch from high water intensive crops & varieties to low water intensive crops & varieties, community participation in the promotion of recharge structures and mobilising of financial resources for operation and maintenance of common water resources. And finally, the farming community, being at the centre of the planning and monitoring process, becomes the most effective regulatory body in terms of identifying deviation and taking appropriate action or regulating themselves.

Steps for undertaking Crop Water Budgeting

There are 11 sheets in the Crop Water Budgeting Tool. Out of 11, nine sheets are about the estimation of existing water availability & requirement for the Rabi crops as per farmers plan. The other 2 sheets are about the revised plan after the discussion held among the community. To fill those 9 sheets, there are 4 formats i.e. ***General, SWB, Drain_Rabi*** and ***Plan for Rabi Crops before CWB***.

Format 1 General- In this format the general information of village is to be filled up. The information of rainfall is to be collected from the secondary source i.e. government department or weather sites. The rainfall in Kharif season is mentioned on actual basis and the rainfall of Rabi season is the average estimation on the basis of last 5 years rainfall for the corresponding period. Rest of the information is to be filled up by the community itself.

General Information of village	
Name of Village-	
Total Area of Village (ha.)-	
Total treated area (Ha.)	
Total open wells in Village-	
Total tube/ bore wells in Village-	
Kharif Season	
Average Rainfall during May to September (MM)-	
Total Functional open wells in village (in Kharif- used in irrigation)-	
Avg. Pumping Hours per Irrigation from open wells (hour)-	
Avg. No of Irrigations from open wells (May to Sep)-	
Total Functional tube wells in village (in Kharif- used in irrigation)-	
Avg. Pumping Hours per Irrigation from bore wells (hour)-	
Avg. No of Irrigations from bore wells (May to Sep)-	
Rabi	
Average Rainfall during October to April (MM)-	
Total Functional open wells in village (in Rabi- used in irrigation)-	
Avg. Pumping Hours per Irrigation from open wells (hour)-	
Avg. No of Irrigations from open wells (Oct to April)-	
Total Functional tube wells in village (in Rabi- used in irrigation)-	
Avg. Pumping Hours per Irrigation from bore wells (hour)-	
Avg. No of Irrigations from bore wells (Oct to April)-	

Format 2 SWB- In this format, the details of various surface water bodies existing in the village are to be filled in for each of the seasons i.e. Kharif & Rabi separately. Here the SWB refers to all kinds of surface water storage bodies i.e. pond, check dams, tank etc. The information to be filled in is as mentioned below-

a. Name of structure- If there is any local name for the water body, it is to be mentioned.
b. Maximum Depth of the Water (met)- It is the maximum height of water in any of the structure. In ponds/ tanks, this could be in the centre of the structure and in the case of check dam, it would be adjacent to the dam.
c. Submergence Area/ Water Spread Area (ha.)-In case of pond/ tank, the area which is filled with water and in case of check dam, the area of back water storage needs to be mentioned.
d. No. of fillings- The no. of times the water has overflown from the structure. If the overflow continues for longer period, it would be counted as one. Once the overflow is stopped and water comes down and again starts to overflow due to rainfall, it would be counted as another filling.

DISTRICT		VILLAGE		
Details of Surface water bodies (WHS/ Pond/ Tank)- May to Sep				
S. No.	Name of Structure	Maximum Depth of Water (meter)	Submergence/ Water Spread Area (ha)	No. of fillings during Rabi season
1				
2				
3				
4				
5				
Details of Surface water bodies (WHS/ Pond/ Tank)- Oct to April				
S. No.	Name of Structure	Maximum Depth of Water (meter)	Submergence/ Water Spread Area (ha)	No. of fillings during Rabi season
1				
2				
3				
4				
5				

Format 3 Drain_Rabi- This format would provide the information for estimation of water available for irrigation during Rabi season from various drains. The below mentioned information is to be filled up in this format-

a. Name of drain (if any)- If there is any local name of the drain, it is to be mentioned.

b. Distance covered by water in meter (M)- At the start of the village where drain has linear flow, consider the 10 meter length of drain to measure the velocity.

c. Time taken to cover the distance in seconds (T)- Any floating material (preferably a piece of plastic material having flat base) to be floated from the starting point of the 10 meter part of the drain and start the stop watch as and when plastic piece is put into water. Now measure the time of reaching this plastic piece to the end point of the 10 meter part of the drain.

d. Width of flowing water in meter (W)- The width of the flowing water is to be taken from the end point of the 10 meter part.

e. Average depth of flowing water in meter (D)- The average depth of the water is also to be taken from the end point of the 10 meter part. For taking average, take the depth of water from 2-3 places.

f. Period of availability of water in days (P)- The total number of days in which water remains in the particular drain in Rabi season are to be put in this cell.

Details of Various Drains in the village (Oct- April)			
DISTRICT		VILLAGE	
Water Available from Drains (Oct- April)			
Name of Drainage Line (Nala)- 1			
Distance covered by Water in Meter -M			
Time taken to cover the distance in seconds -T			
Width of flowing water in meter -W			
Average depth of flowing water in meter -D			
Period of availability of water in days- P			
Name of Drainage Line (Nala)- 2			
Distance covered by Water in Meter -M			
Time taken to cover the distance in seconds -T			
Width of flowing water in meter -W			
Average depth of flowing water in meter -D			
Period of availability of water in days- P			
Name of Drainage Line (Nala)- 3			
Distance covered by Water in Meter -M			
Time taken to cover the distance in seconds -T			
Width of flowing water in meter -W			
Average depth of flowing water in meter -D			
Period of availability of water in days- P			

Format 4 Plan for Crop_Before CWB- This is the crop plan for Rabi season evolved by the farmers on their own without any suggestion or any external technical input. In this format farmer wise details is filled up which would further be used to estimate the total requirement of water for the Rabi crops. Various information to be filled in this format, are as under-

a. Name of the crops- Name of various crops to be grown in the Rabi season.
b. Number of farmer- Crop wise number of farmers to be mentioned.
c. Area under crop (ha.)- Area to be cultivated in Rabi season under each crop.
d. No. of irrigation- Total number of irrigation to be provided to irrigate the specific crop during the Rabi season.
e. Pumping hours per irrigation- It is the average of total pumping hours during whole cropping season to irrigate the crops. If there are 5 irrigations and total pumping hours are 20 then the average pumping hours would be 4 hours.
f. Discharge rate of irrigation pump (Lit/ Hour)-This is the total water discharged in one hour from the irrigation pump. This information can be taken from the secondary sources on the basis of pump capacity or may be measured in field itself. It is also mentioned on the irrigation pumps.

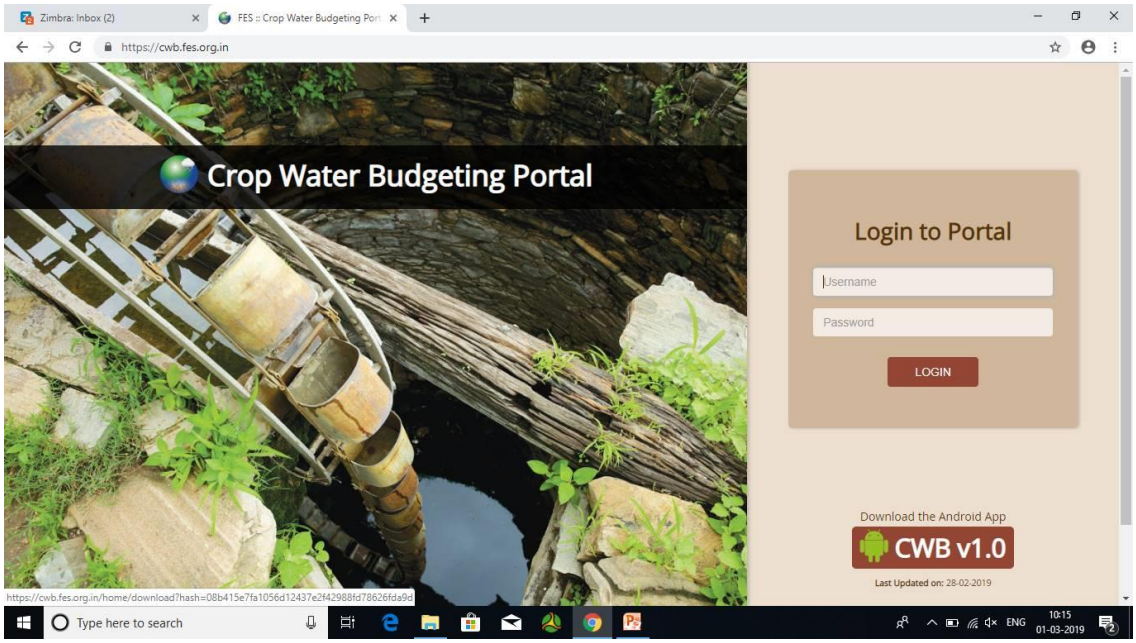
Crop wise estimation for water usage for Rabi crops – Farmer's Own Plan (Before CWB)						
S. No.	Name of the crop	No. of farmers	Area under Crop (Ha)	Present use of water to irrigate various crops (farmers' practices)		
				No. of irrigation	Pumping hours/ irrigation	Discharge rate of irrigation pump (litres/ hour)
			A	B	C	D
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
TOTAL						

The information collected in the above formats is now filled up in the Crop Water Budgeting Tool on the android mobile / tablet.

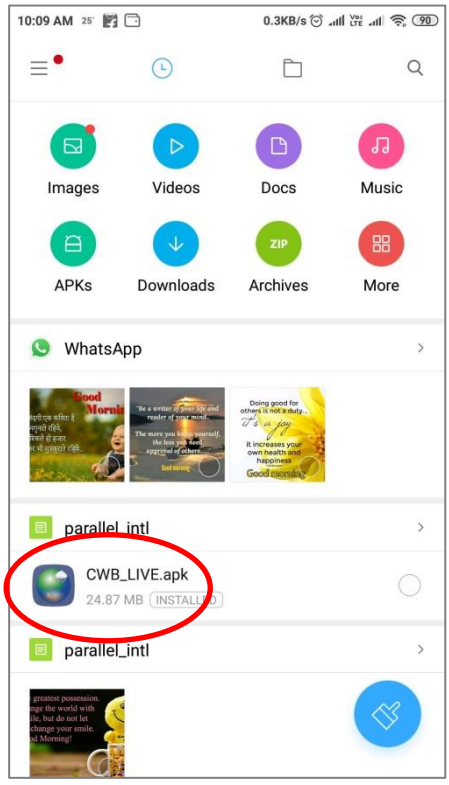
Downloading and installation of the Crop Water Budgeting Application (CWB App)

It's an open source Android based application and available for downloading on- https://cwb.fes.org.in/

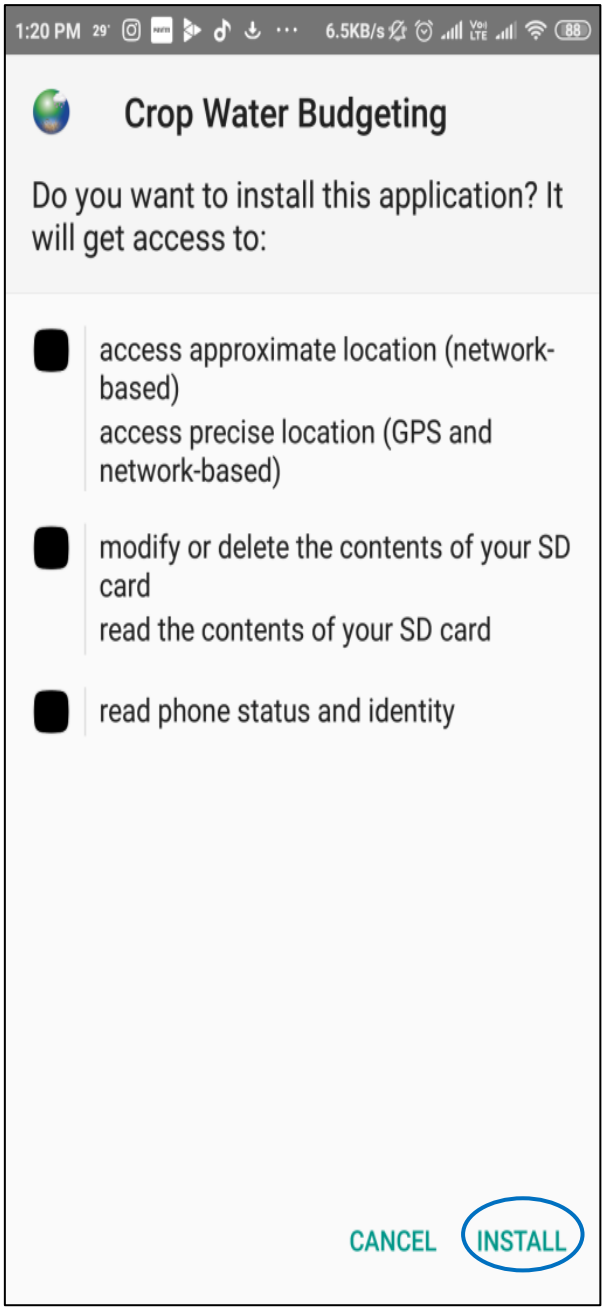
First browse the above website on your moile or tablet which would be seen like below picture.

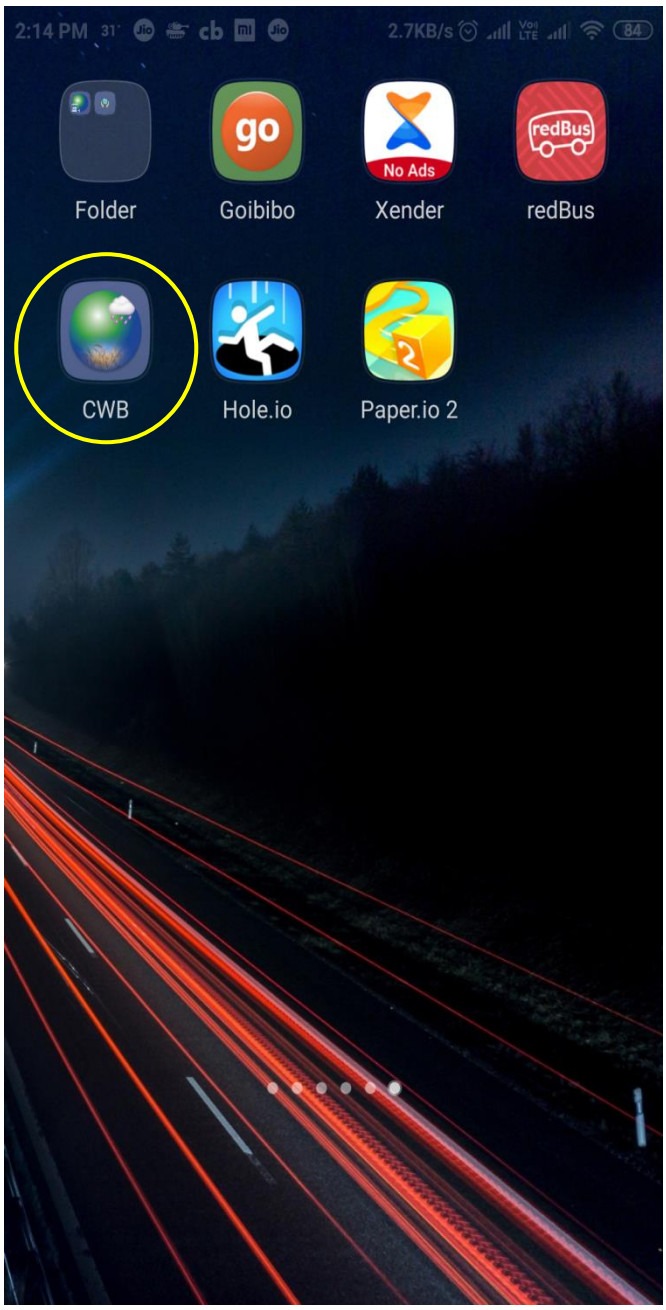


Click on the '**CWB v1.0**' icon as shown in the picture in red circle. The app would be downloaded on your mobile/ tablet. This would be stored in the internal storage in download folder or may be in other folder on the mobile/ tablet depending upon the mobile version as shown below in red circle.



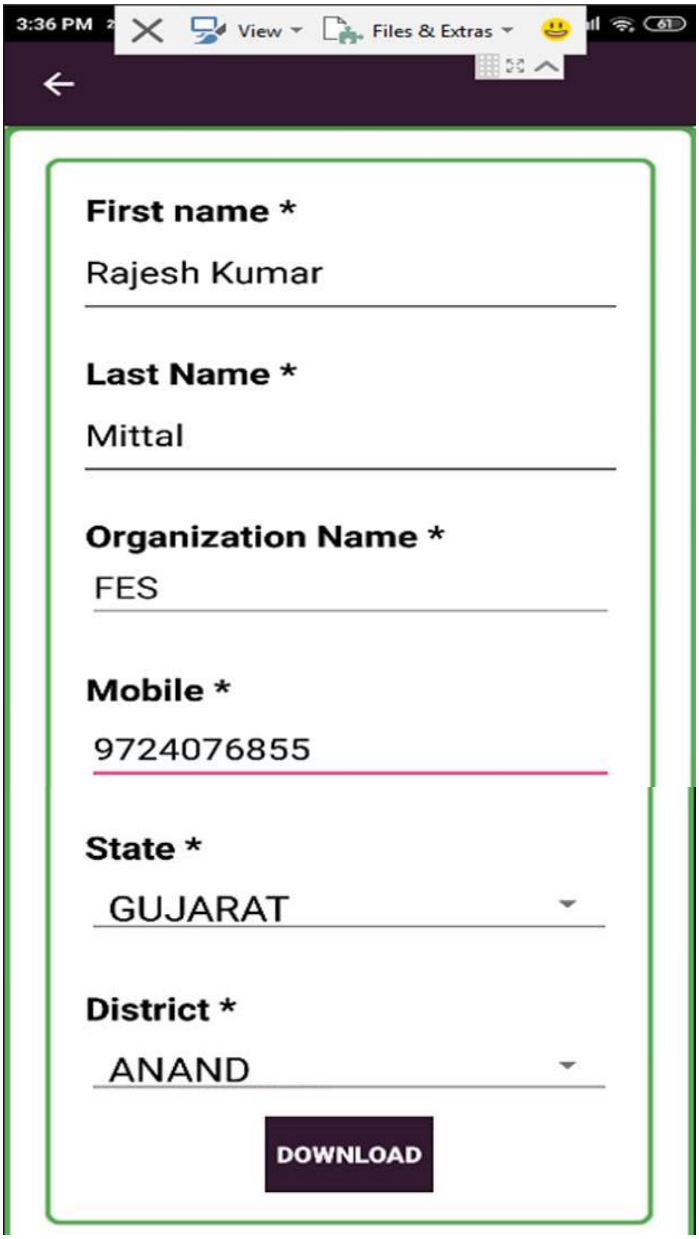
Click on the downloaded CWB app and after clicking, below mentioned screen would appear and we have to click on install. The CWB app would be now installed and an icon would appear on the mobile / tablet.





Registration and downloading the CWB form

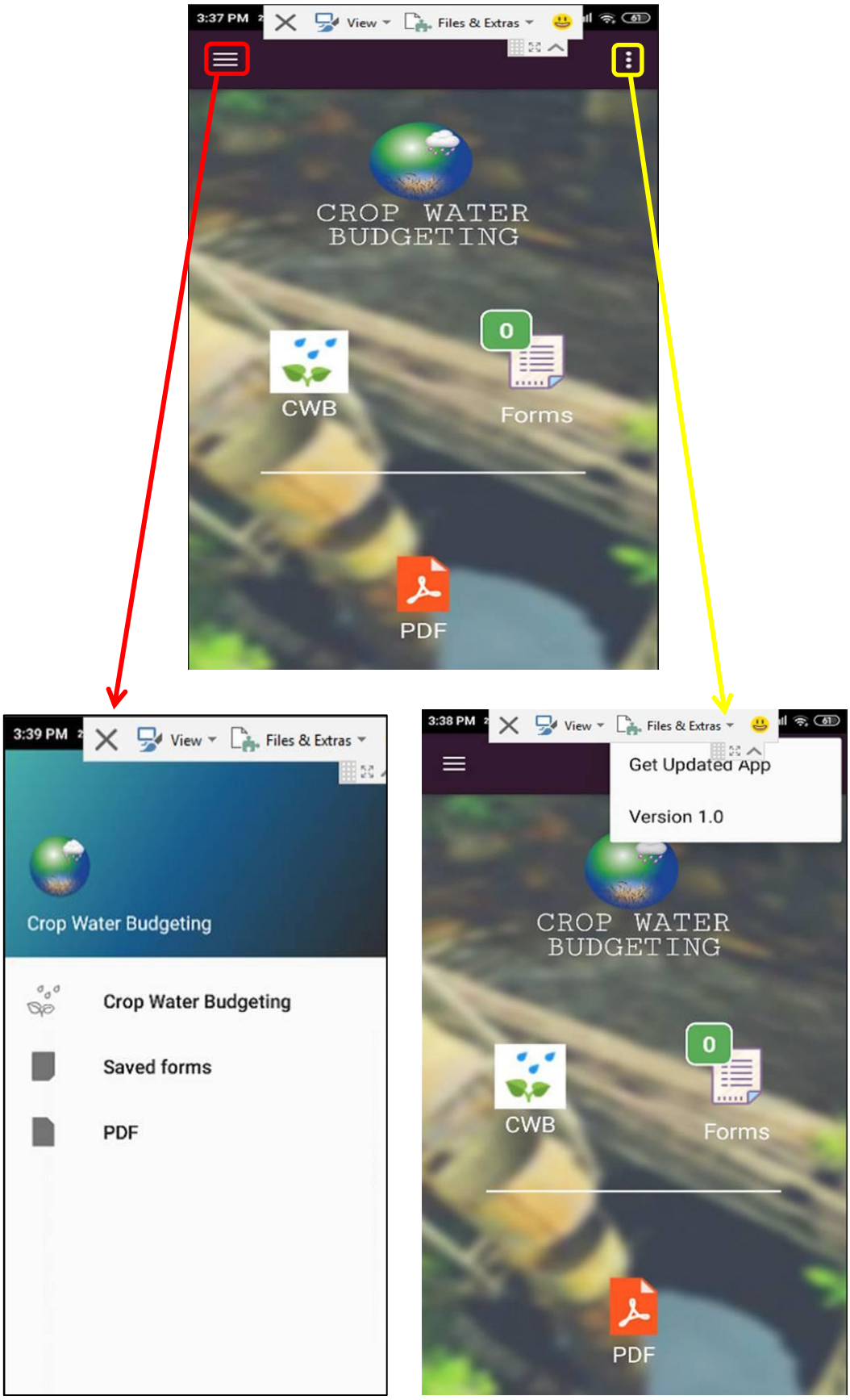
Open the application by clicking on the Crop Water Budgeting icon. A screen for registration would open, where one time registration is required by the user.



After clicking on DOWNLOAD, the below mentioned sheet would appear. There are 3 lines on the left side and 3 dots on the right side as outlined in red and yellow colour respectively.

On clicking on the lines, page will open showing the Crop Water Budgeting, Saved Forms and PDF which are otherwise are shown on earlier page also.

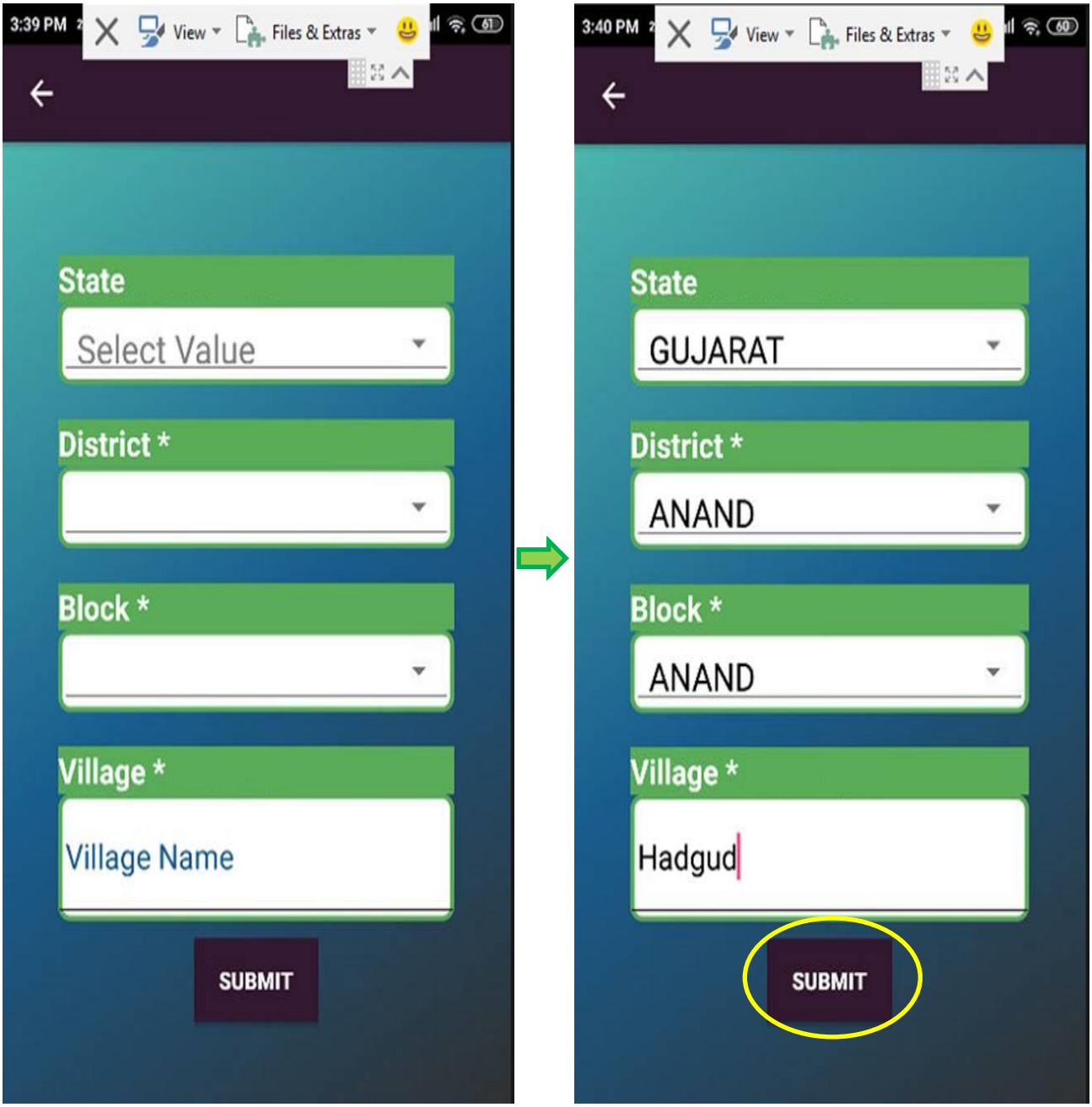
On clicking on the 3 dots, a window will open showing Get updated app and present app information. If there is any updated version of the app, by clicking on the Get Updated App, it would be updated.



It is to be noted that it is required to be in internet zone till registration & download. After that it would work in offline mode (without internet). If you want to Get Updated App, the device should have internet connectivity.

Filling up the CWB forms

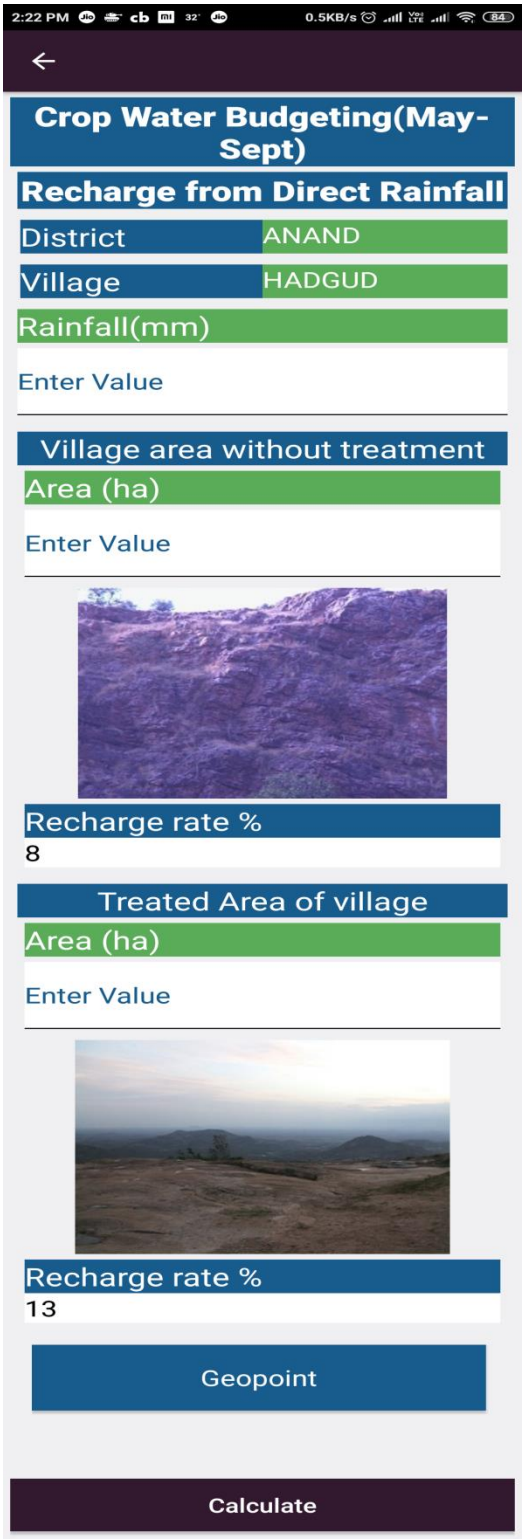
To start the Crop Water Budgeting for a particular village, click on the CWB button and one sheet would appear in which State, District, Block & Village details are to be filled as shown in the pictures below-

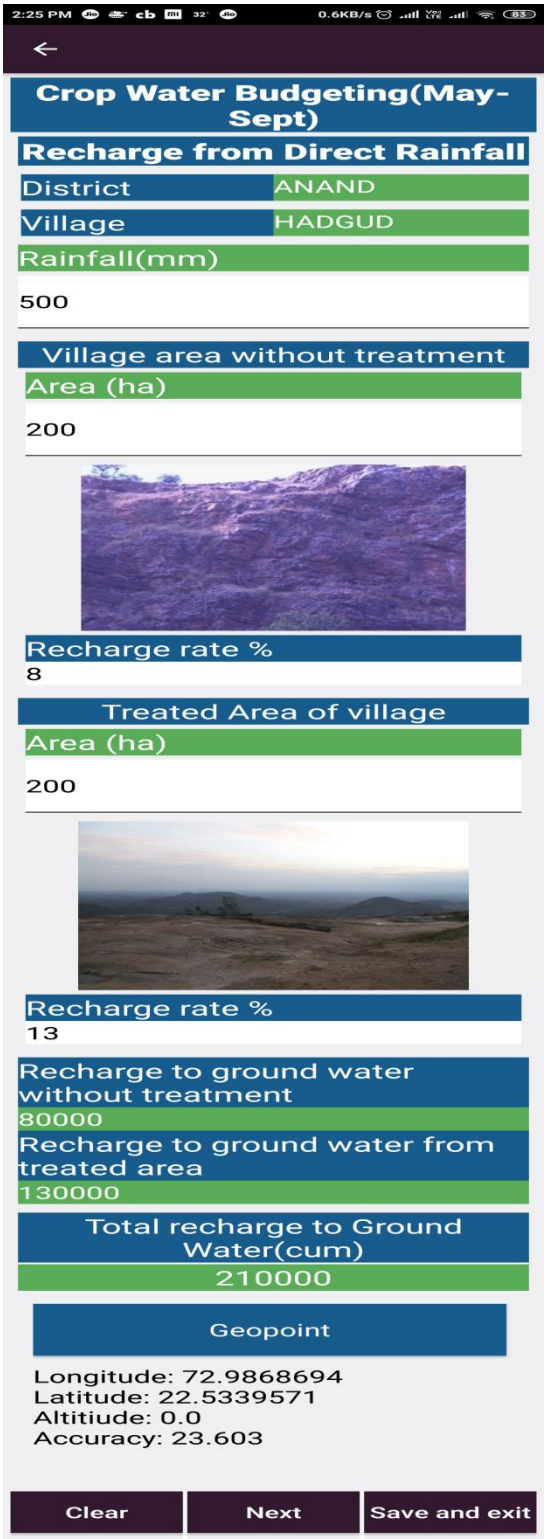


After filling the required information click on the SUBMIT button and different sheets would appear on the screen one by one for filling the data collected earlier in the 4 formats in participation with community to estimate the availability & demand of water through this application.

Different sheets, to be appeared on the screen and filling the data in those sheets are shown one by one as under-

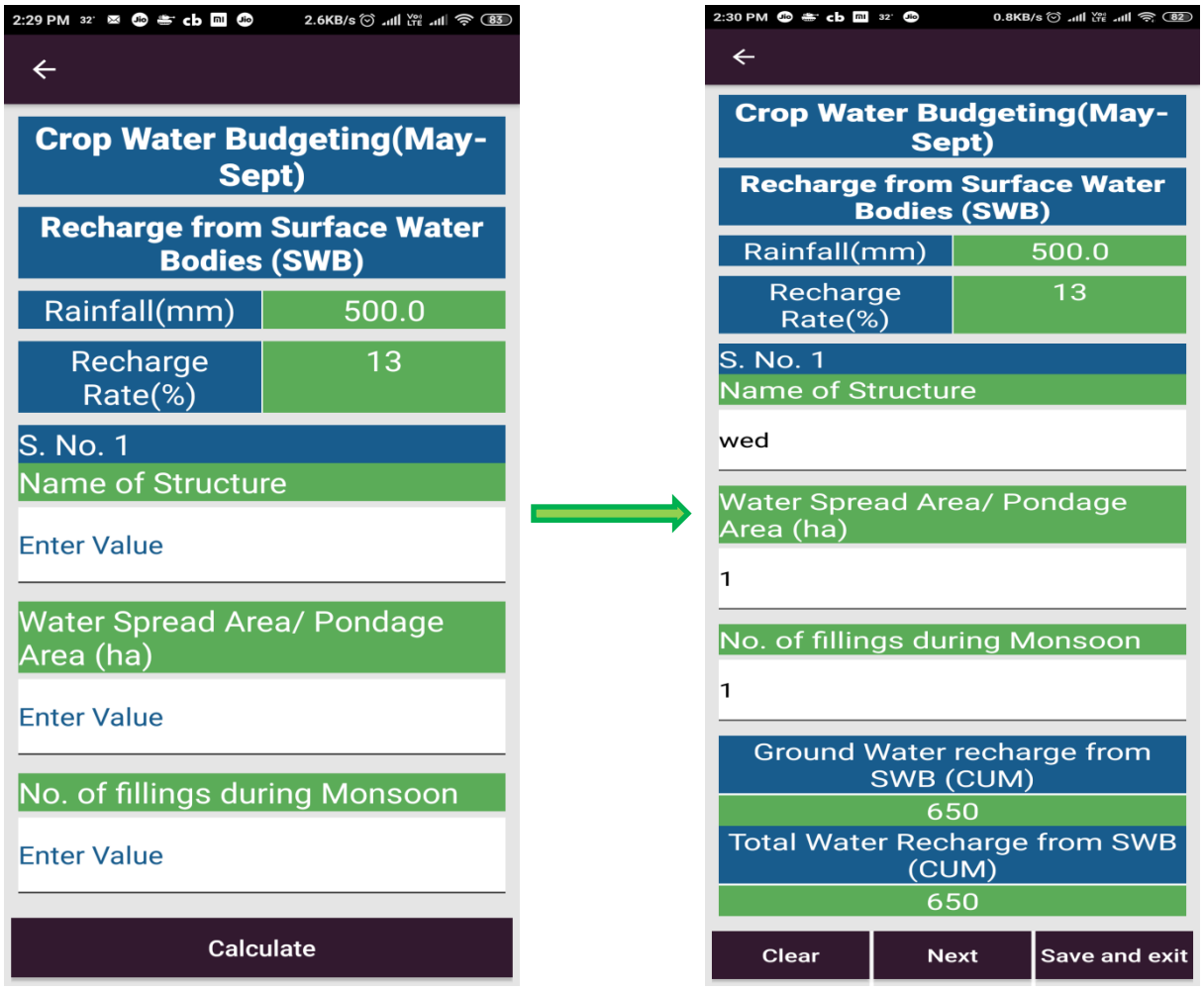
Sheet No. 1- Recharge from Direct Rainfall (May- September)



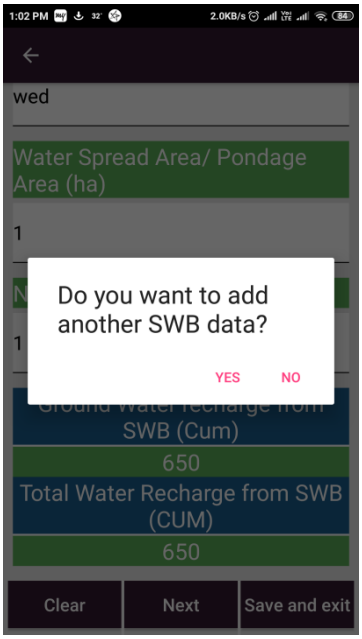


After filling each form, 3 buttons i.e. Clear, Next & Save and exit would appear at the bottom. If any of the data is wrongly filled, click on the Clear button and all the data would be deleted & one can fill the data again. If the data filled is correct, can be continued for the next form or can be saved the filled form and exit from the app. The form would be saved and whenever you like, can continue to fill it from the subsequent form.

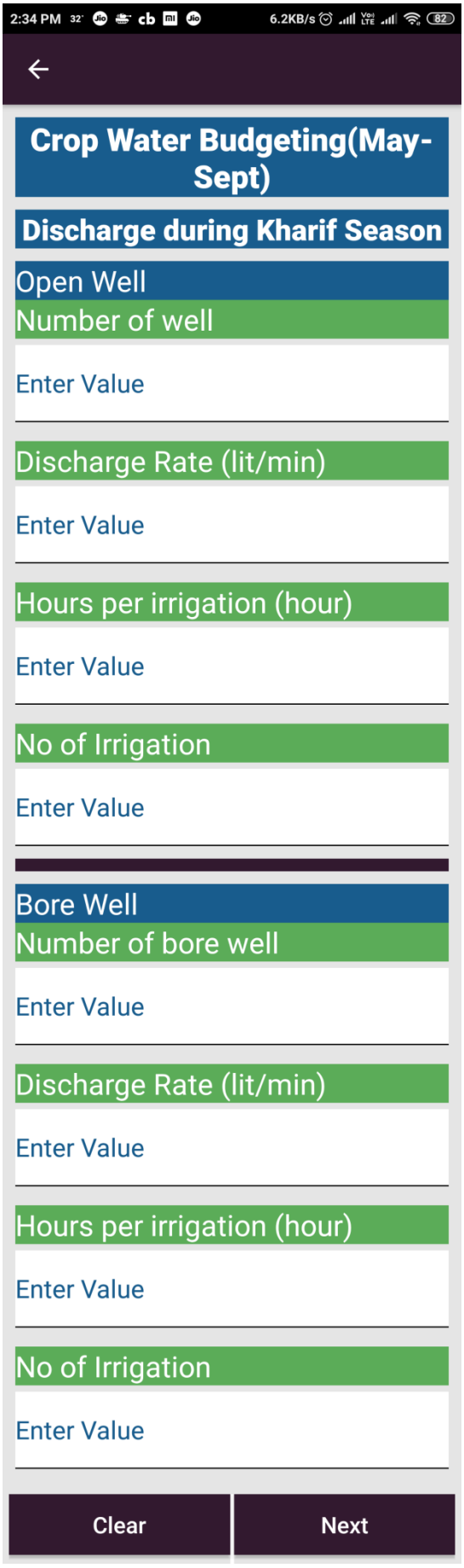
Sheet No. 2- Recharge from Surface Water Bodies (May-Sep)

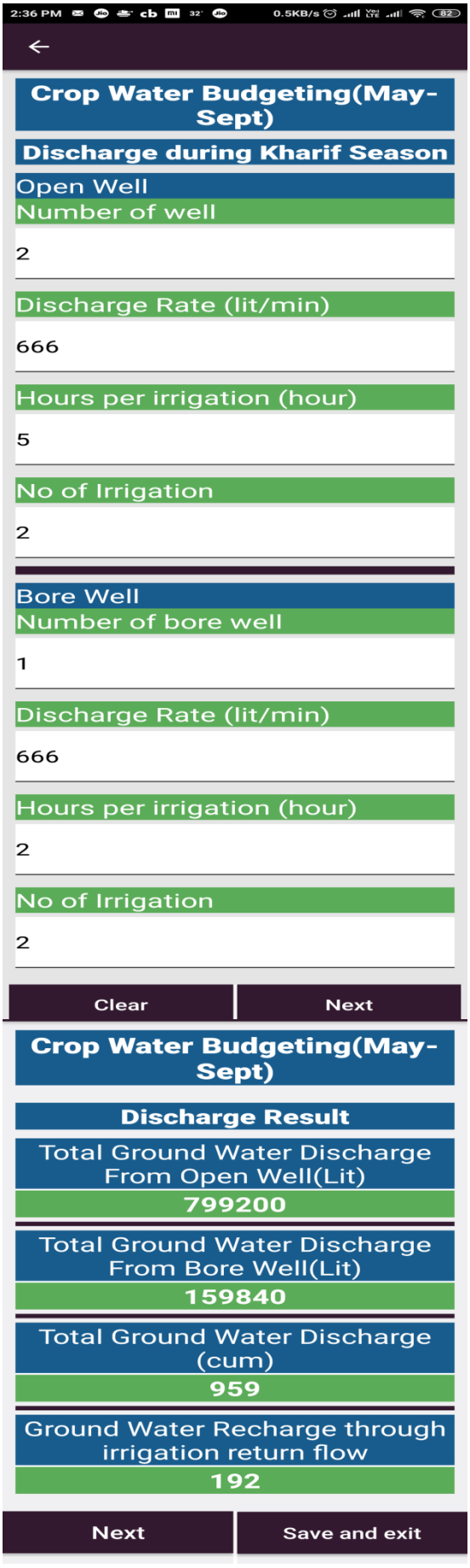


Data for multiple structures can also be filled in this sheet. Once the data for one structure is filled and click the next button, it would ask for another SWB data as shown under. Click ‘Yes’ for adding data or ‘No’ for moving to next form.

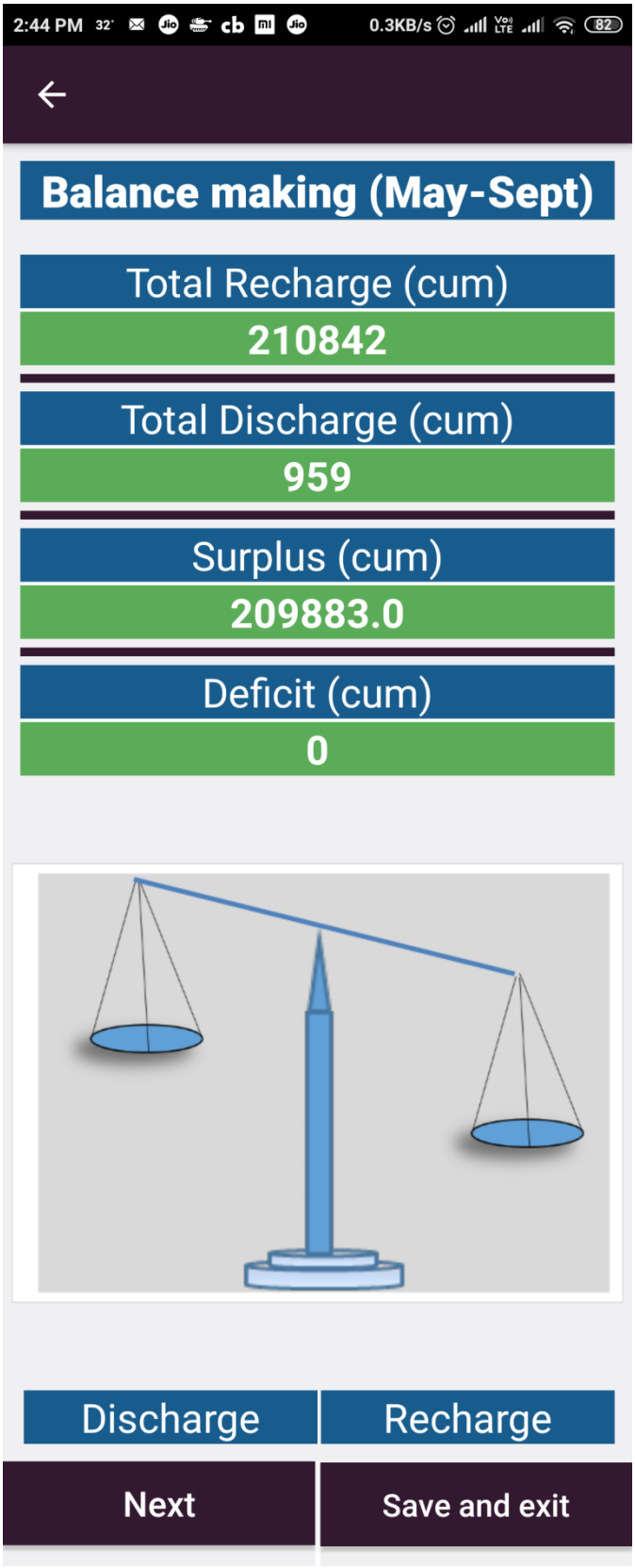


Sheet No. 3- Discharge during Kharif Season (May-Sep)



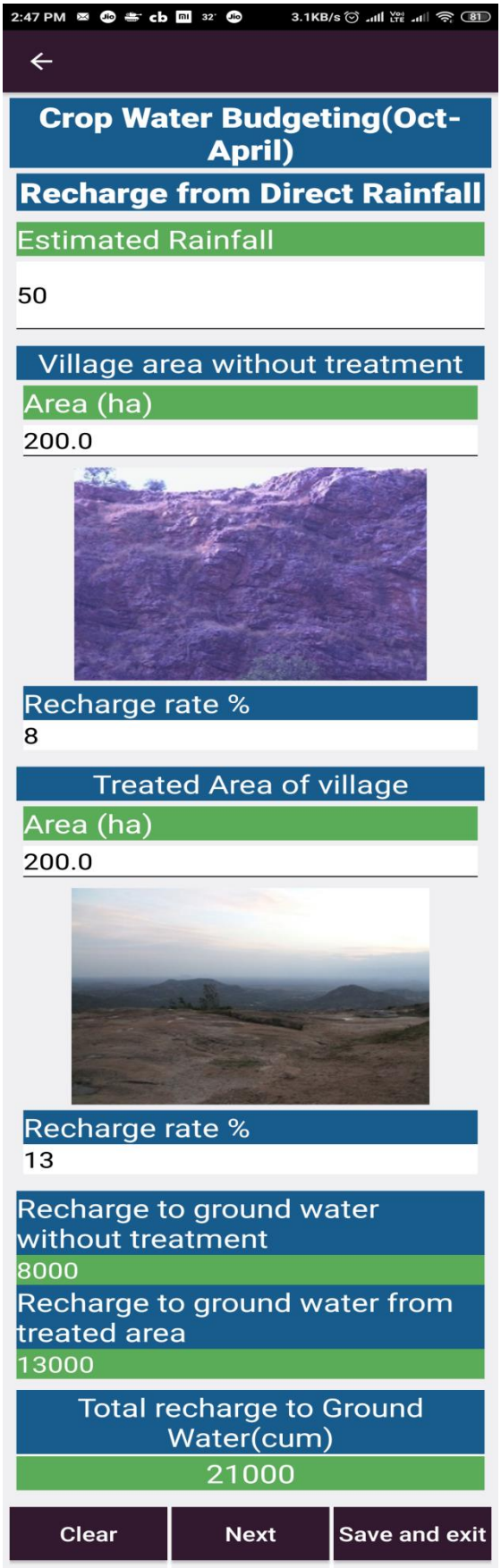


Sheet No. 4- Balance making (May-Sep)

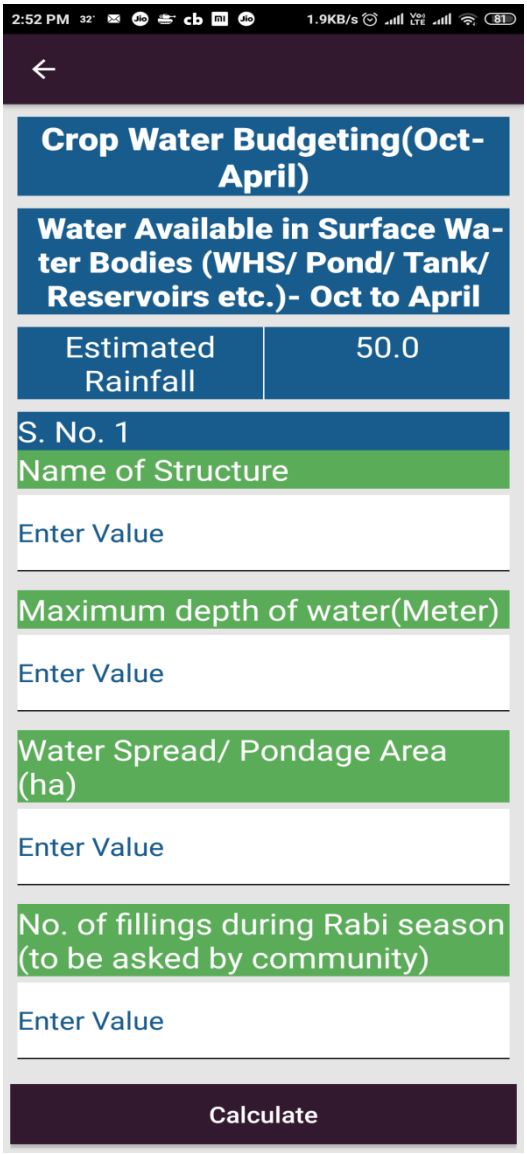


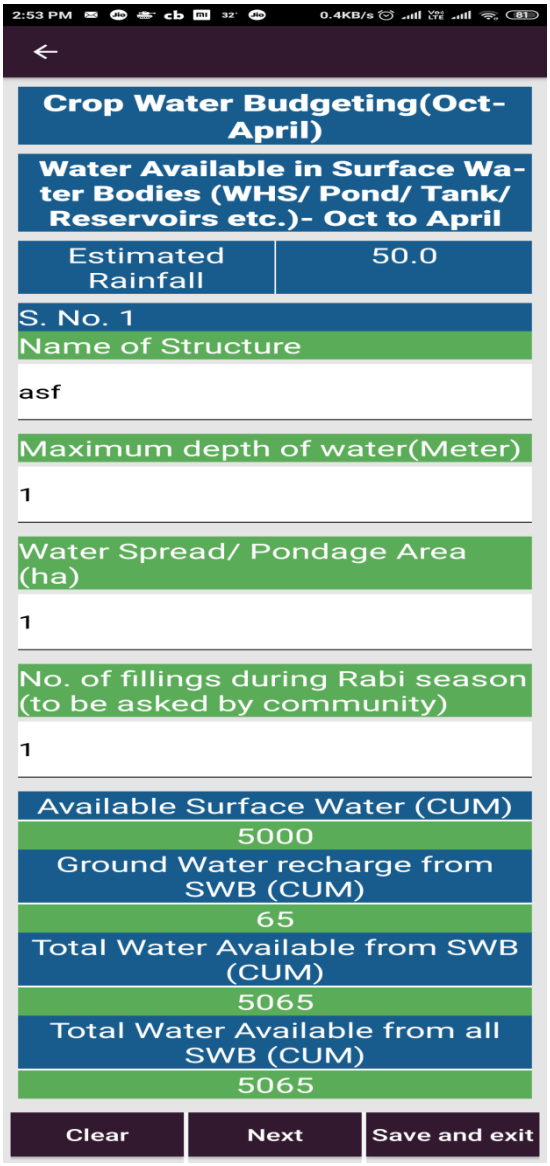
Up to the above sheet, information of Kharif season has been filled up and above balance will appear showing the surplus water available for subsequent Rabi season. Information of Rabi season would now be filled up in Sheet no. 5 onwards.

Sheet No. 5- Recharge from Direct Rainfall (Oct- April)

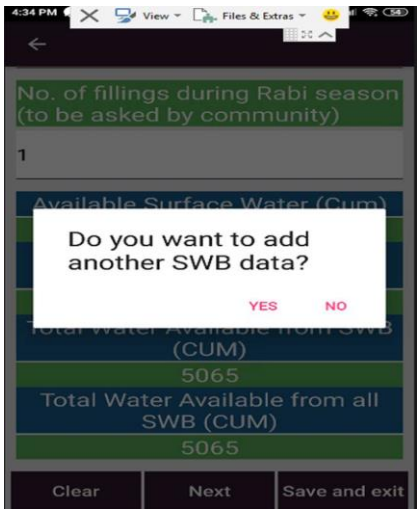


Sheet No. 6- Water Available from Surface water bodies (WHS/ Pond/ Tank) (Oct to April)

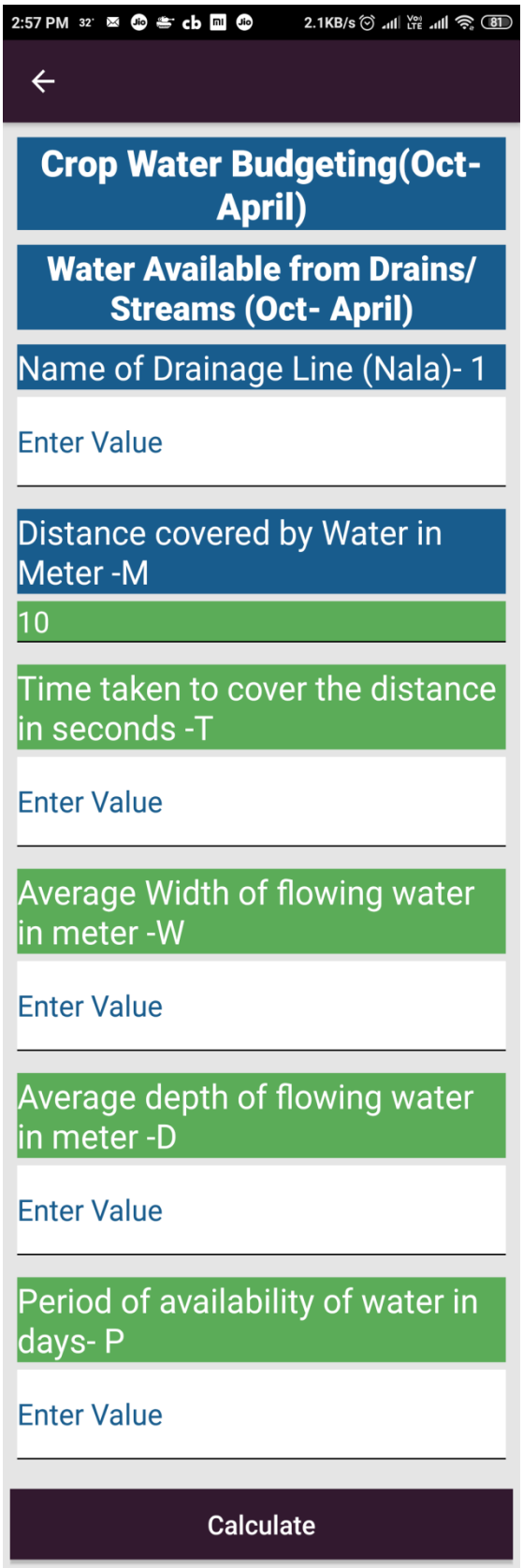


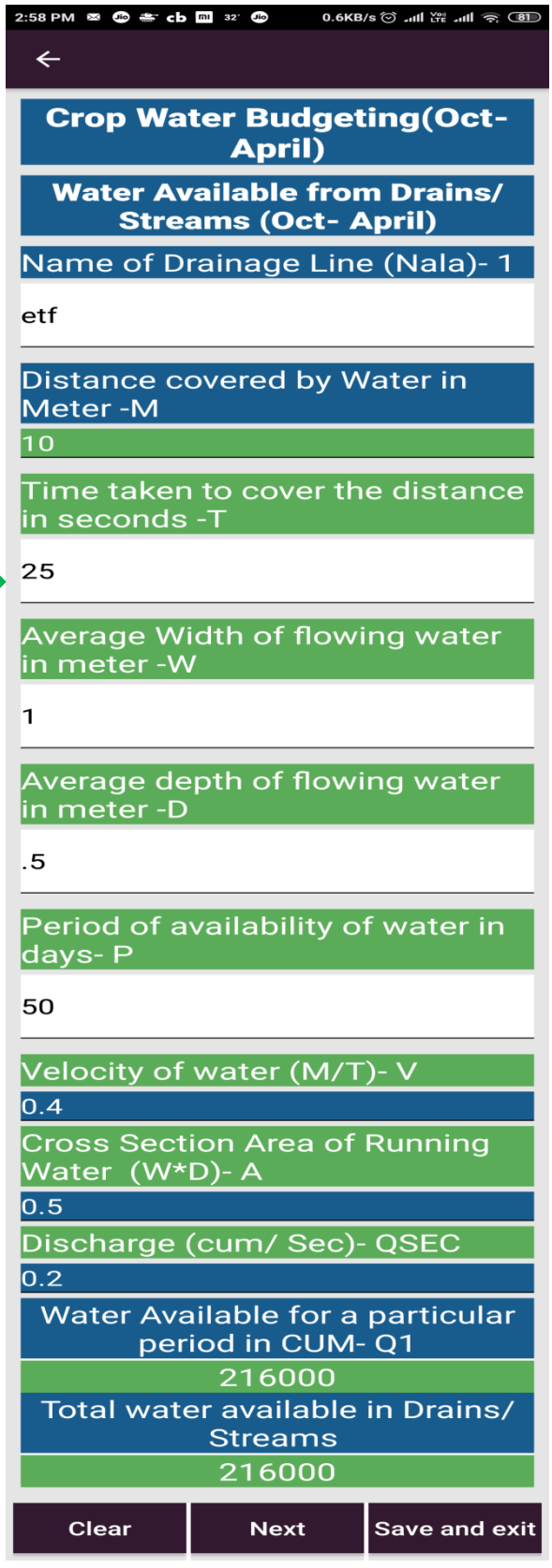


Data for multiple structures can also be filled in this sheet. Once the data for one structure is filled and click the next button, it would ask for another SWB data as shown under. Click 'Yes' for adding data or 'No' for moving to next form.

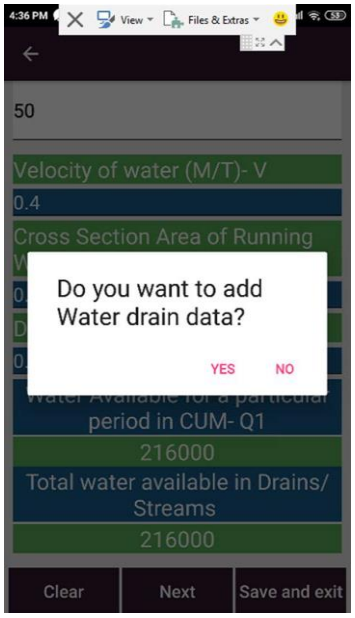


Sheet No. 7- Water Available from Drains/ Streams (Oct to April)



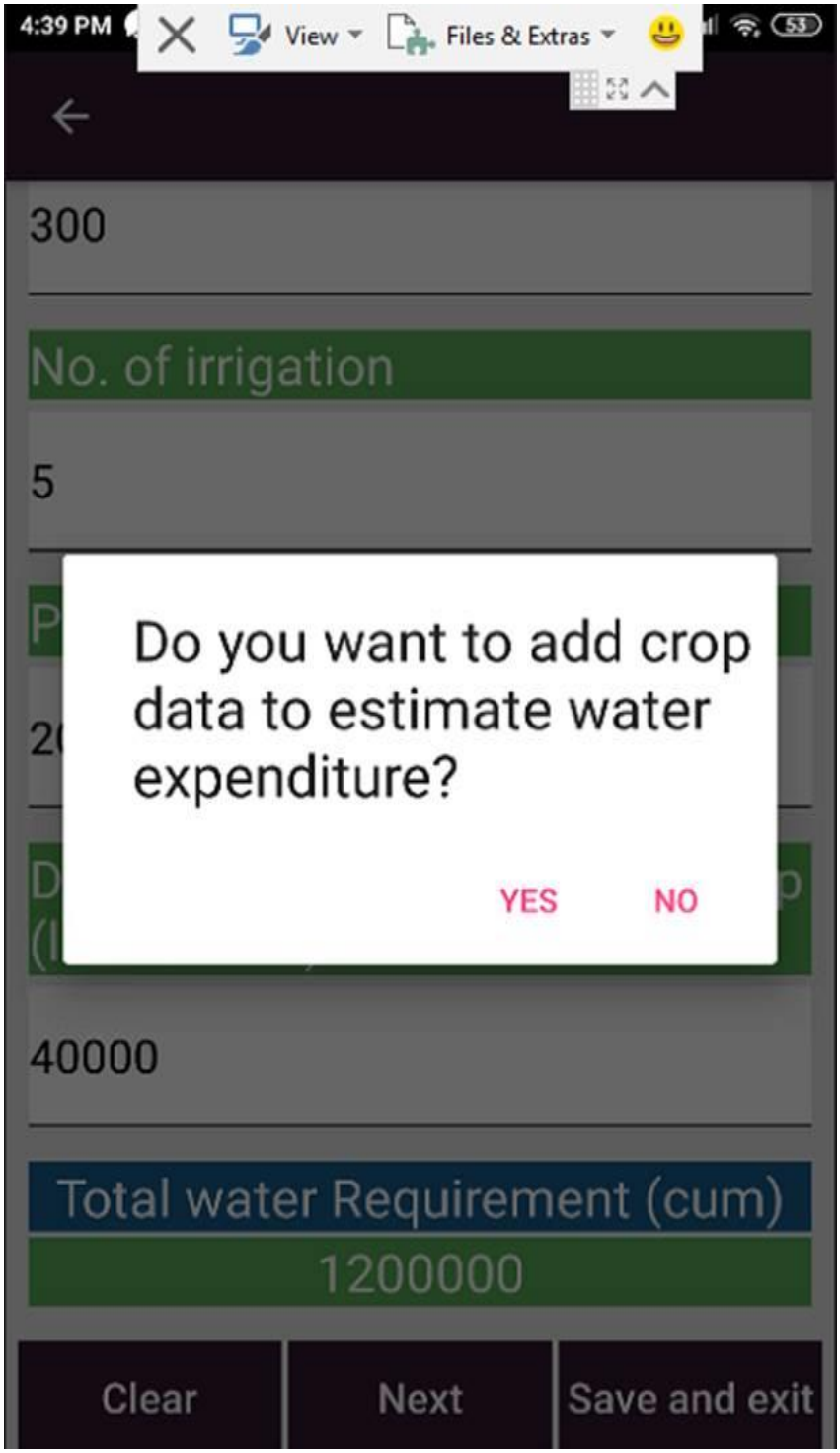


Data for multiple drains can be filled in this sheet. Once the data for one drain is filled and click the next button, it would ask for another Drain data as shown under. Click ‘Yes’ for adding data or ‘No’ for moving to next form.



Sheet No. 8- Estimation for water usage for Rabi crops

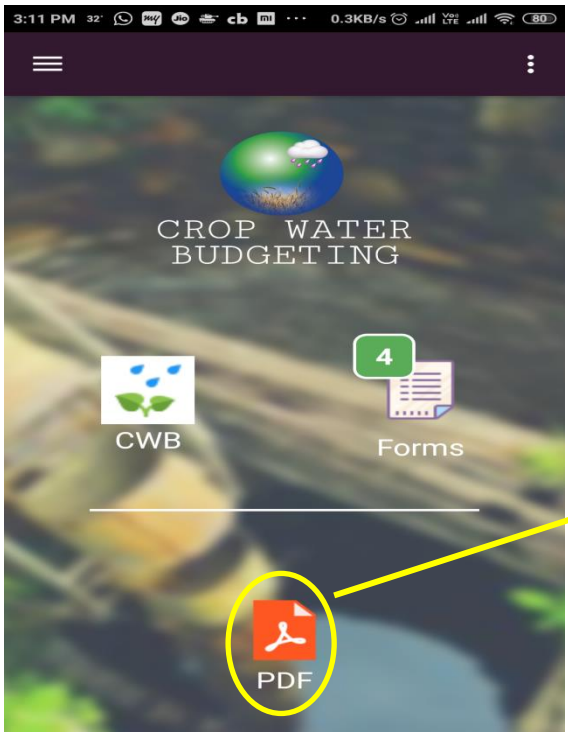
Data for multiple crops can be filled in this sheet. Once the data for one crop is filled and click the next button, it would ask for another crop data as shown under. Click ‘Yes’ for adding data or ‘No’ for moving to next form.

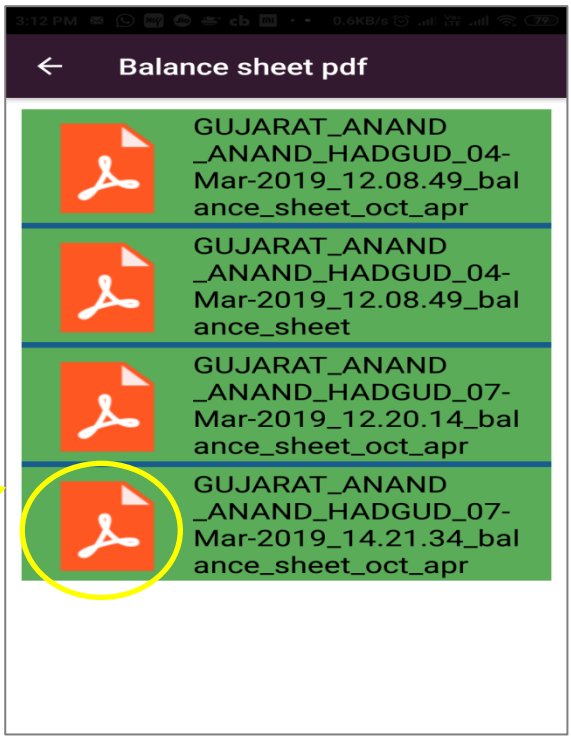


If we click on the No button, we would get the estimation of total water available & requirement for Rabi season in the next sheet, which would be depicted in pictorial form also.

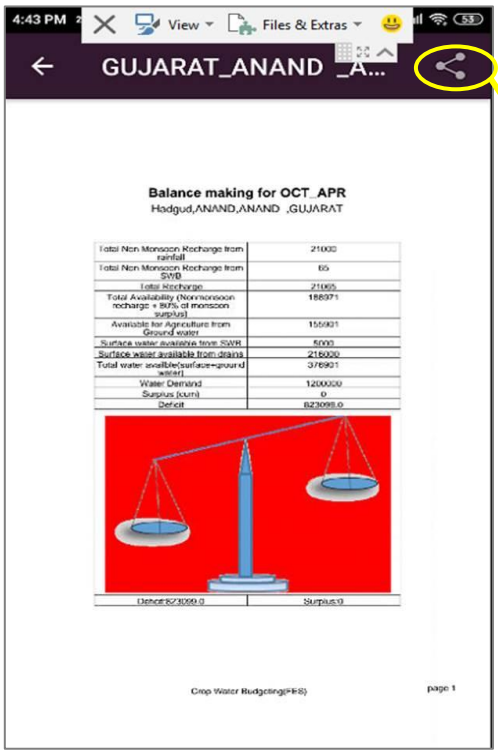
Sheet No. 9- Estimation for water expenditure for Rabi / summer crops

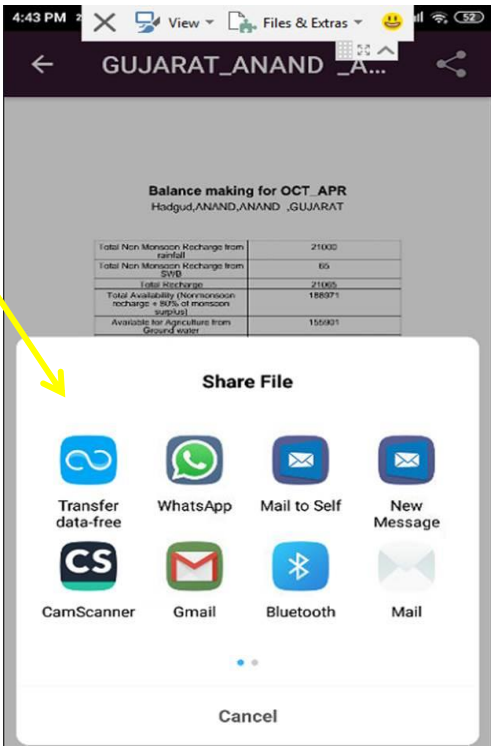
We can save & exit here and in the main page, PDF would be available of the above sheet i.e. Sheet no. 9, which can further be used for developing poster/ flax for using it in the community discussions. By clicking on the PDF logo, list of all the PDF files will appear on the screen as shown under.





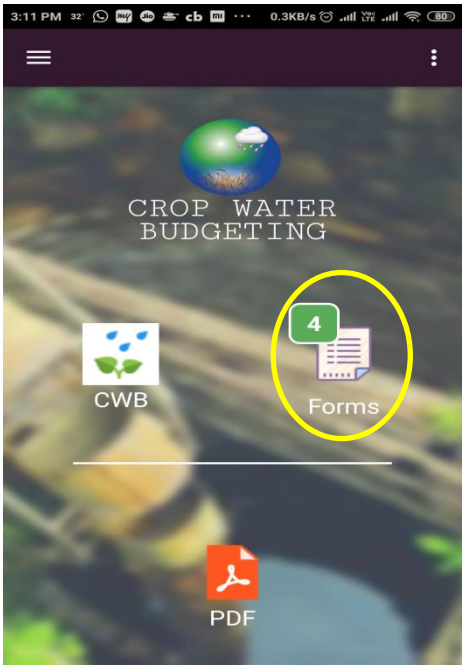
As we click on any of the PDF in the list, the selected PDF file would appear on the screen, which can be shared via email, whatsApp, Bluetooth etc.



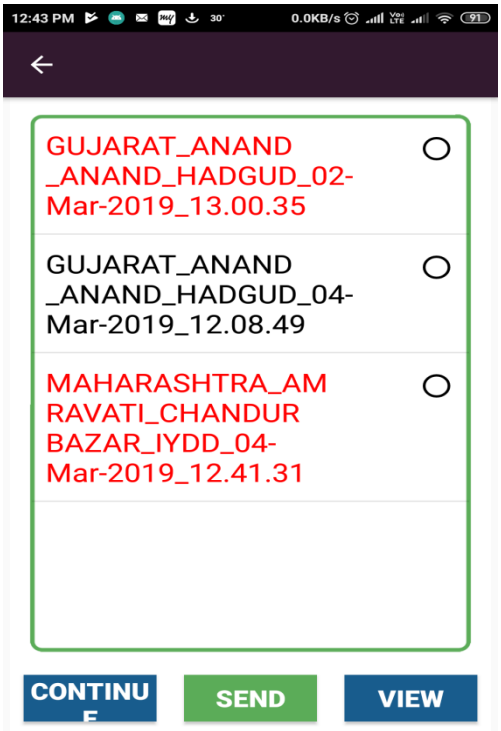


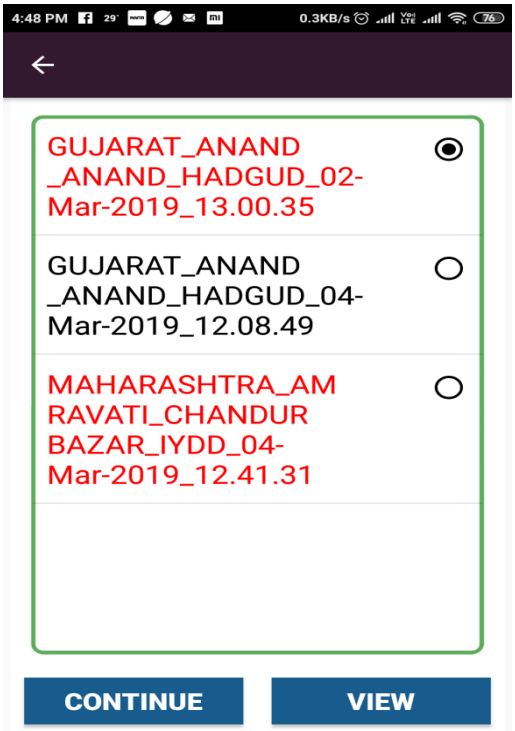
NOTE- *It is to be noted that after getting the water estimation in sheet no. 9, the dash board is prepared and presented before the community for triggering the discussion amongst them about crop water management. The detail of dashboard preparation & presentation is presented at the last. This is preliminary presentation to discuss possible changes in the cropping or/ and practices to encourage water savings.*

The saved form will be available and can be continued whenever you want.



When you click on the forms button, the list of saved forms will appear on the screen. The incomplete forms would be in red colour and completed ones would be in black colour.





There are 3 buttons below the list of forms i.e. CONTINUE, SEND & VIEW. If incomplete form (in red colour) is selected, the SEND button would disappear and only CONTINUE & VIEW would be there.

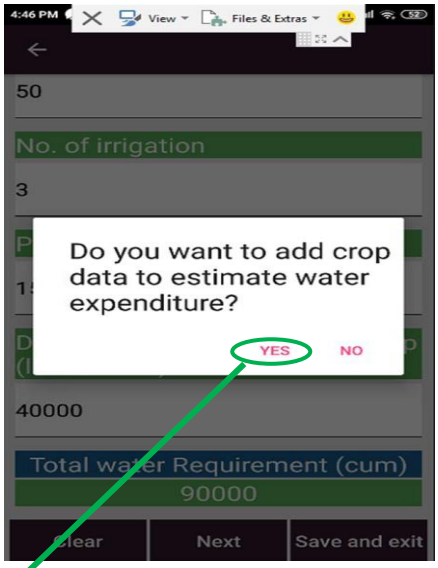
Once the CONTINUE button is clicked the form would open and subsequent sheet will be available for filling the data.

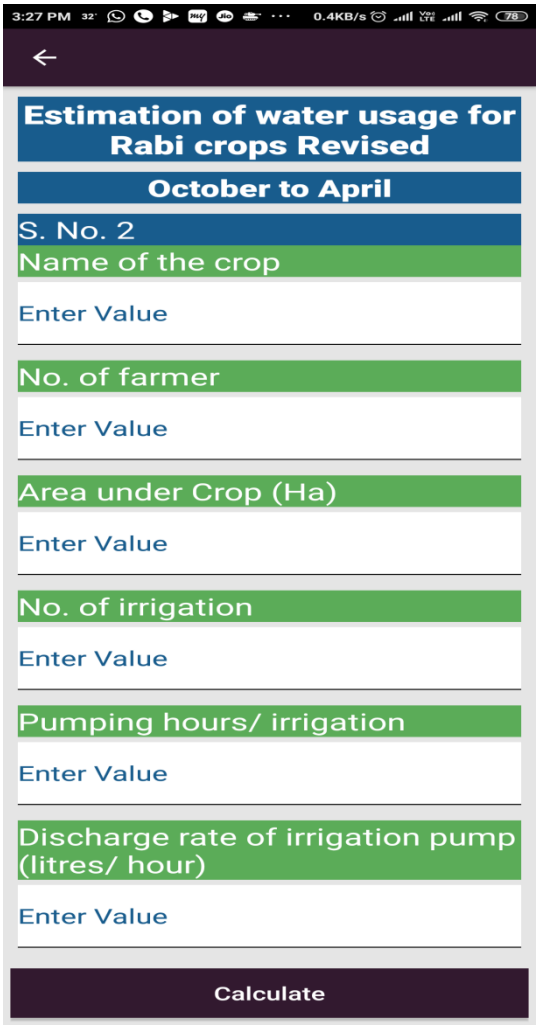
Sheet No. 10- Estimation for water usage for Rabi crops- Revised

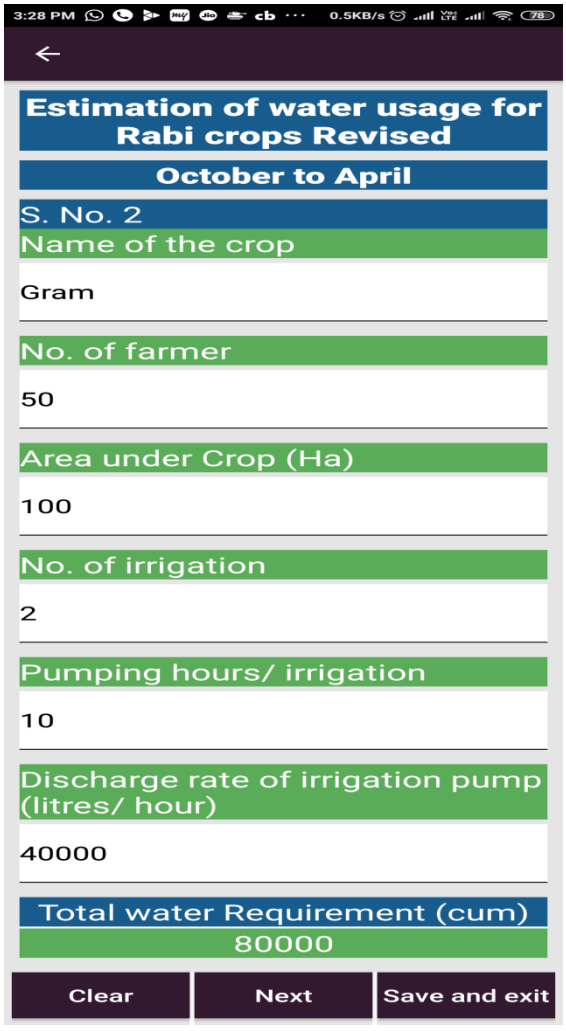
After discussion amongst community, there may be chance of changing their Rabi crop plan & if it is so, the data of revised plan is filled in the Sheet no. 10.

As Sheet no. 8, data for multiple crops can be filled in this sheet also. Once the data for one crop is filled and click the next button, it would ask for another crop data as shown under. Click 'Yes' for adding data or 'No' for moving to next form.

If Yes is clicked, the sheet would open for adding the crop data & data for another crop may be filled in as shown below-



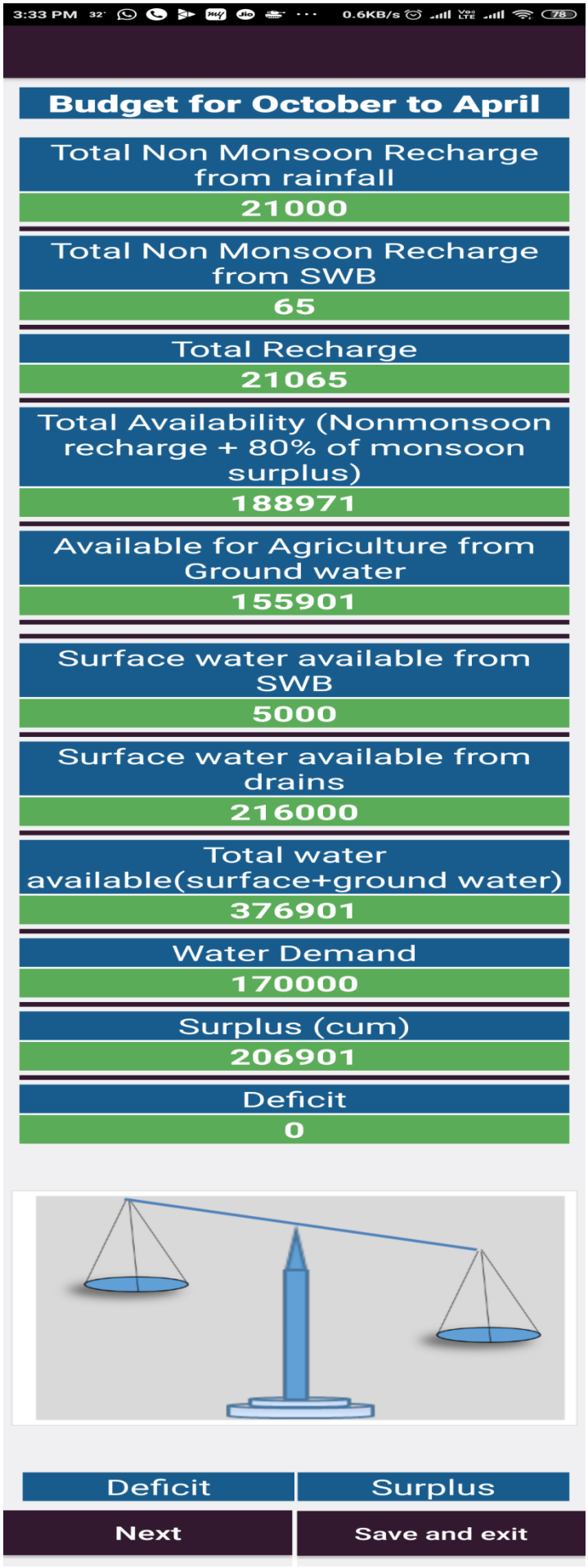




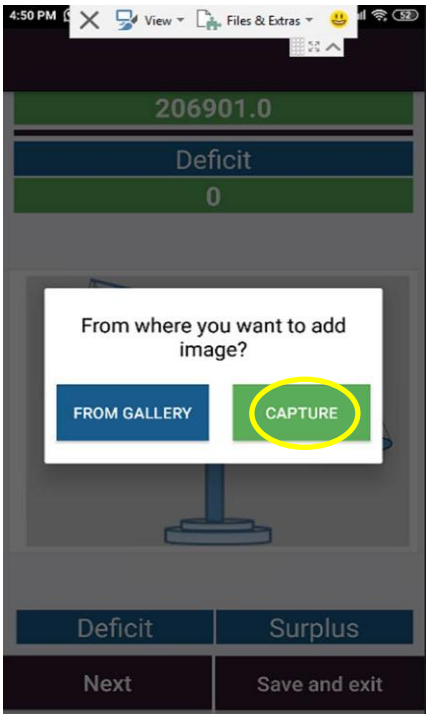
As shown above, data for multiple crops can be filled in the sheet no. 10. Clicking on the Next button, again it would ask for adding crop data.

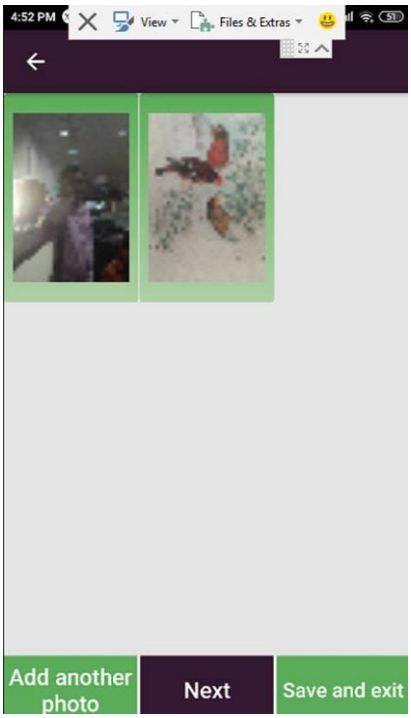
Sheet No. 11 Estimation for water expenditure for Rabi / summer crops Revised Plan

If we click on the No button, we would get the estimation of total water available & revised requirement for Rabi season in the next sheet, which would also be depicted in pictorial form as shown under-

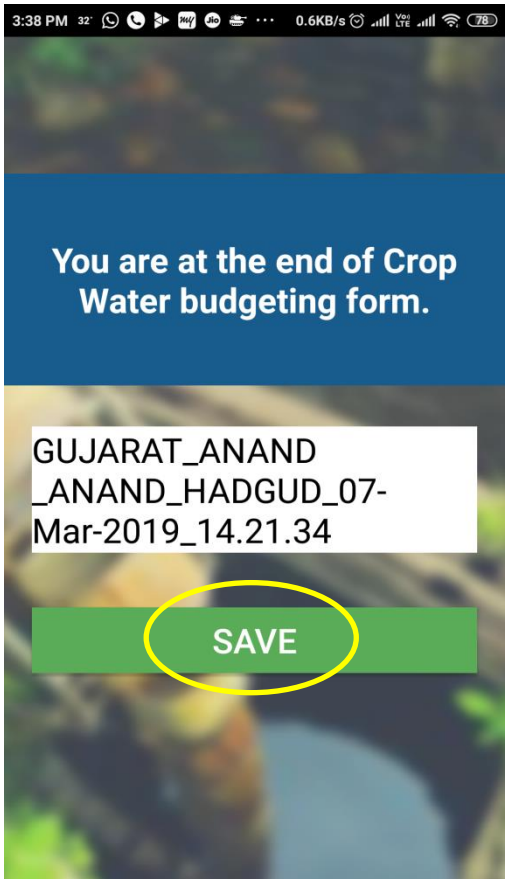


On clicking the Next button, a window would open asking for adding the image. One can add image from gallery or capture. If we click capture, the camera would open and multiple photos can be captured one by one as shown below-

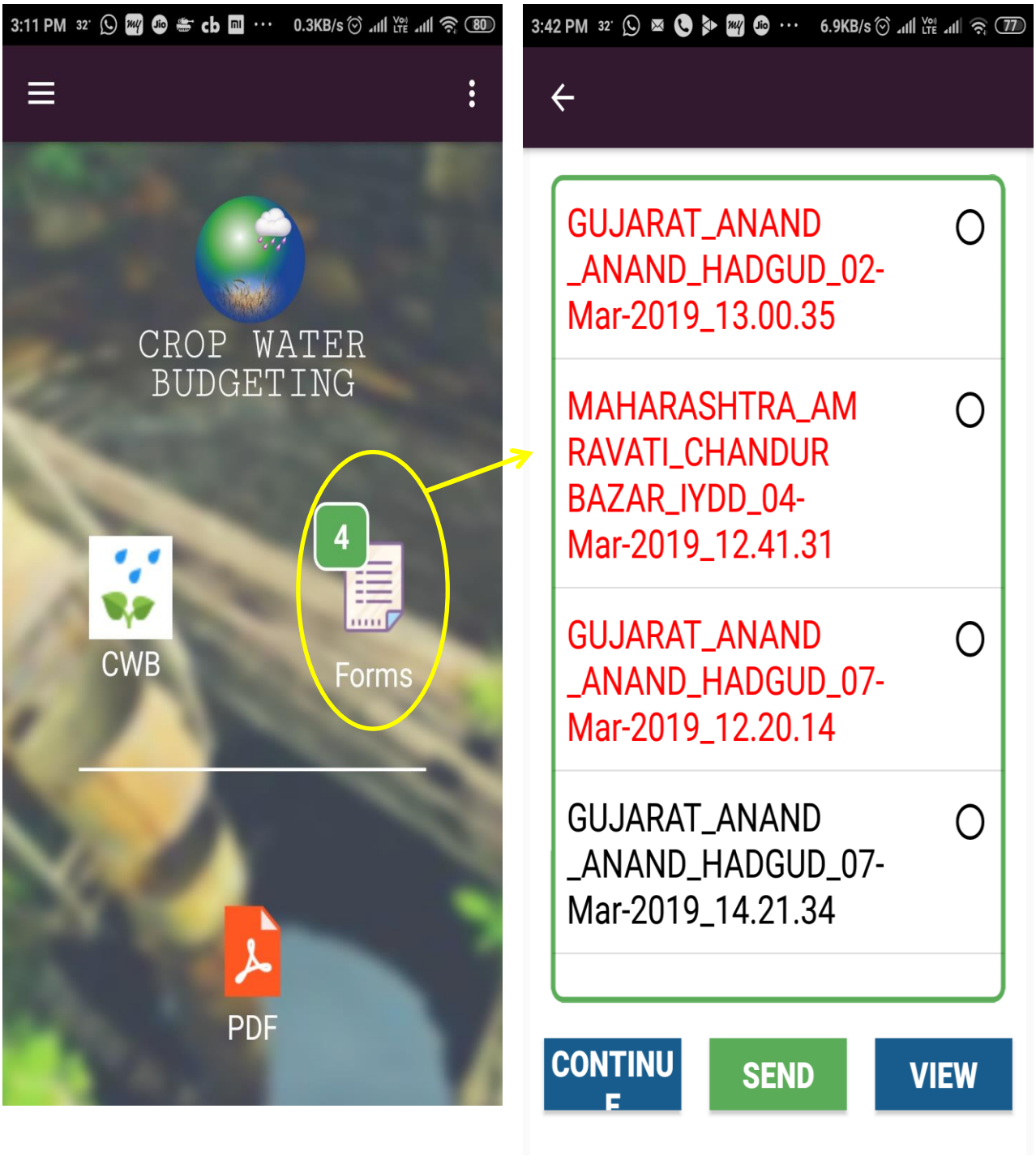




Clicking on Next button, the below mentioned screen would open and you can save your completed form here by pressing SAVE button.



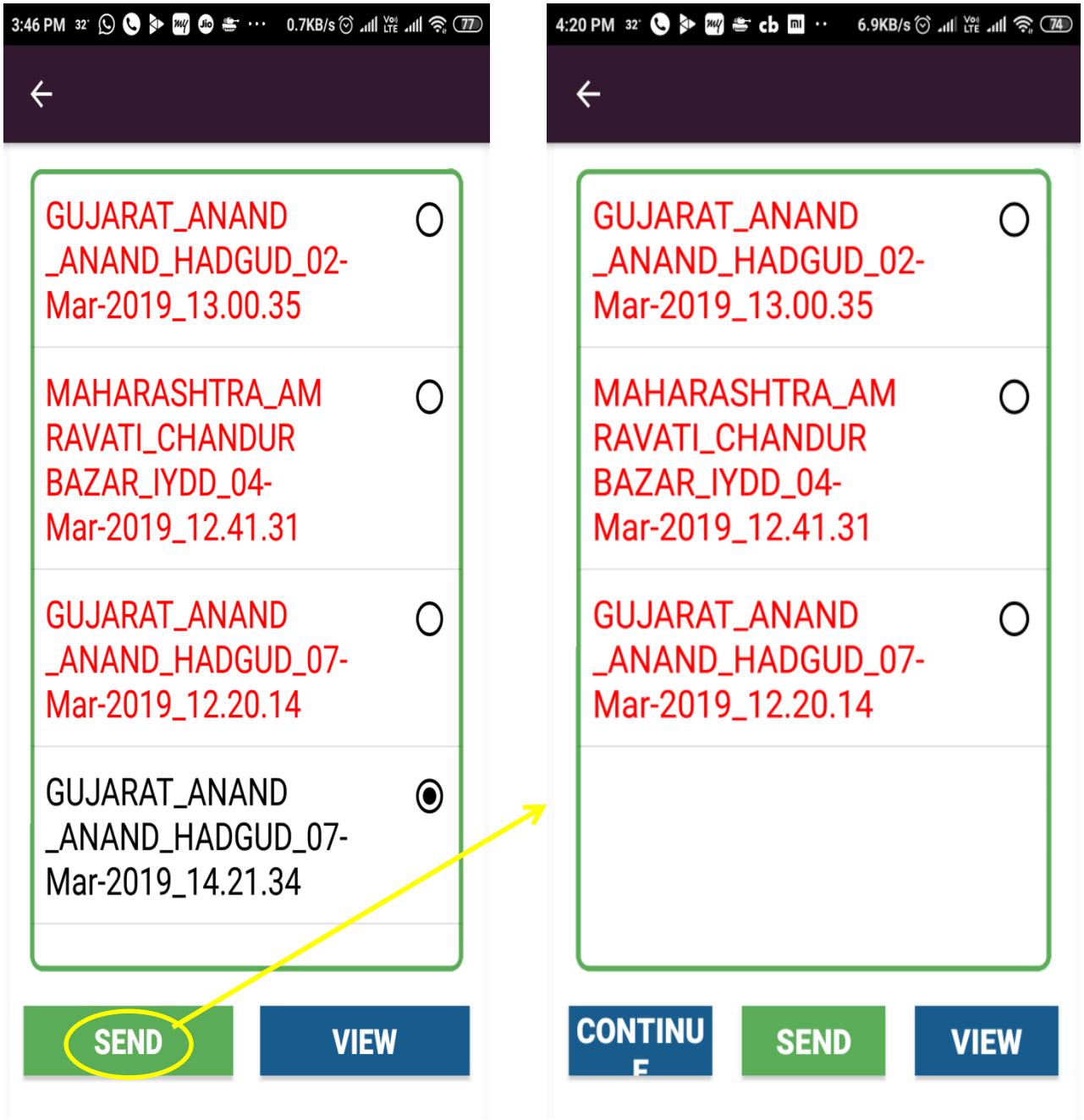
The saved form would appear on the main page along with PDFs shown under-



After clicking on the Forms button, all the forms saved would appear on the screen with CONTINUE, SEND & VIEW buttons. It is to be noted that incomplete forms would be in RED colour & completed forms would appear in BLACK colour.

When we select a completed form from the list, the CONTNUE button would disappear and only SEND & VIEW buttons would be there and when SEND button is clicked, the form would be saved on the server and now this form is not available in the mobile/ tablet.

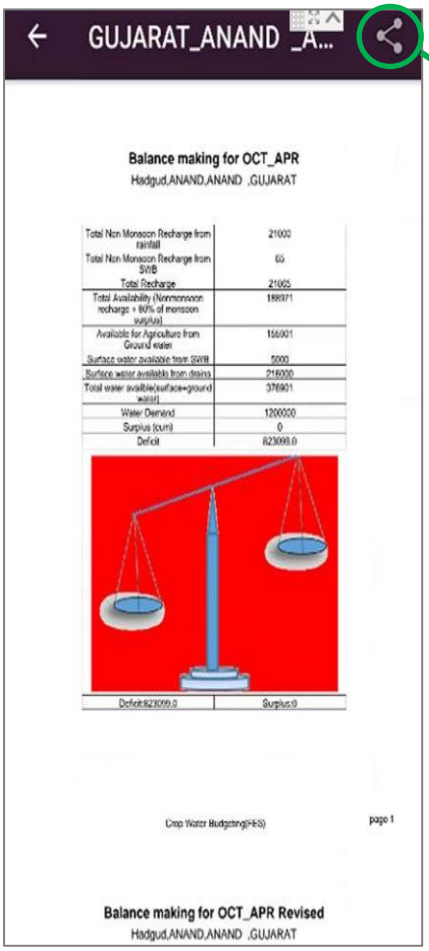
It is to be noted that for sending the form to the server the internet connectivity is needed.

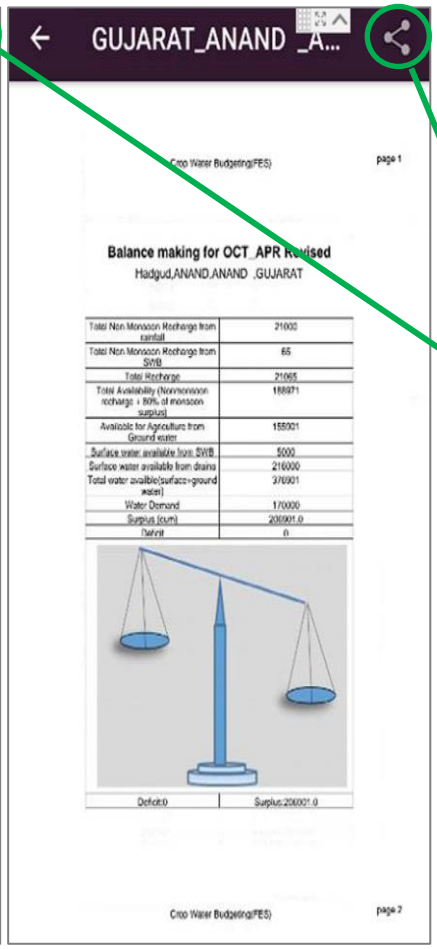


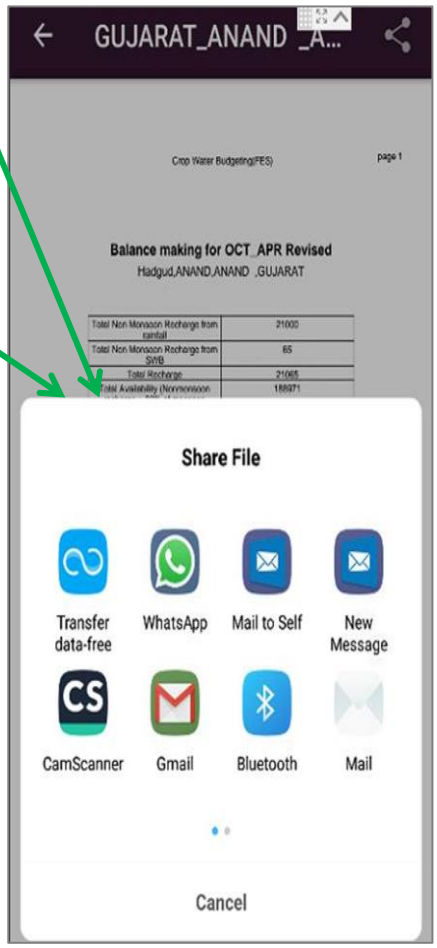
The PDFs generated after sheet no. 9 and sheet no. 11, would be saved in the mobile/ tablet despite sending the form to the server and would be available until those are not removed/ deleted from the device.

These PDFs can be shared via different ways and used to develop posters/ flax charts etc. for using in the community/ farmers meeting.


4:23 PM
1.0KB/s
Balance sheet pdf
GUJARAT_ANAND _ANAND_HADGUD_04-Mar-2019_12.08.49_balance_sheet_oct_apr
GUJARAT_ANAND _ANAND_HADGUD_04-Mar-2019_12.08.49_balance_sheet
GUJARAT_ANAND _ANAND_HADGUD_07-Mar-2019_12.20.14_balance_sheet_oct_apr
GUJARAT_ANAND _ANAND_HADGUD_07-Mar-2019_14.21.34_balance_sheet_oct_apr
GUJARAT_ANAND _ANAND_HADGUD_07-Mar-2019_14.21.34_balance_sheet

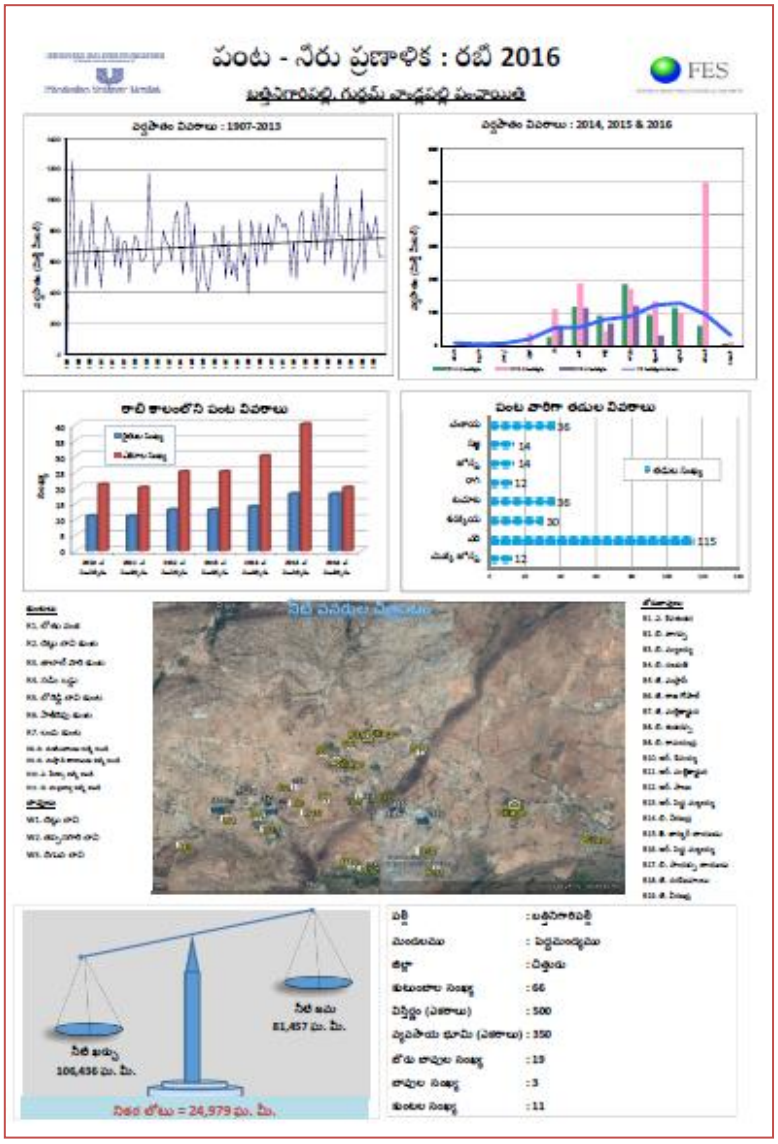

GUJARAT_ANAND _A...
Balance making for OCT_APR
Hadgud,ANAND,ANAND ,GUJARAT
Balance making for OCT_APR Revised
Hadgud,ANAND,ANAND ,GUJARAT


GUJARAT_ANAND _A...
Balance making for OCT_APR Revised
Hadgud,ANAND,ANAND ,GUJARAT


GUJARAT_ANAND _A...
Balance making for OCT_APR Revised
Hadgud,ANAND,ANAND ,GUJARAT
Share File
Transfer data-free
WhatsApp
Mail to Self
New Message
CamScanner
Gmail
Bluetooth
Mail
Cancel

Dashboard preparation & presentation before the community

The PDFs generated after sheet no. 9 i.e. report card with water balance is printed on chart or flex sheet along with other charts i.e. rainfall pattern, cropping pattern, crop wise irrigation requirement and details of wells & tube wells over last 30-40 years; water resource map etc. as shown below-



This dashboard is now presented before the community to trigger the discussion around the water & crops.

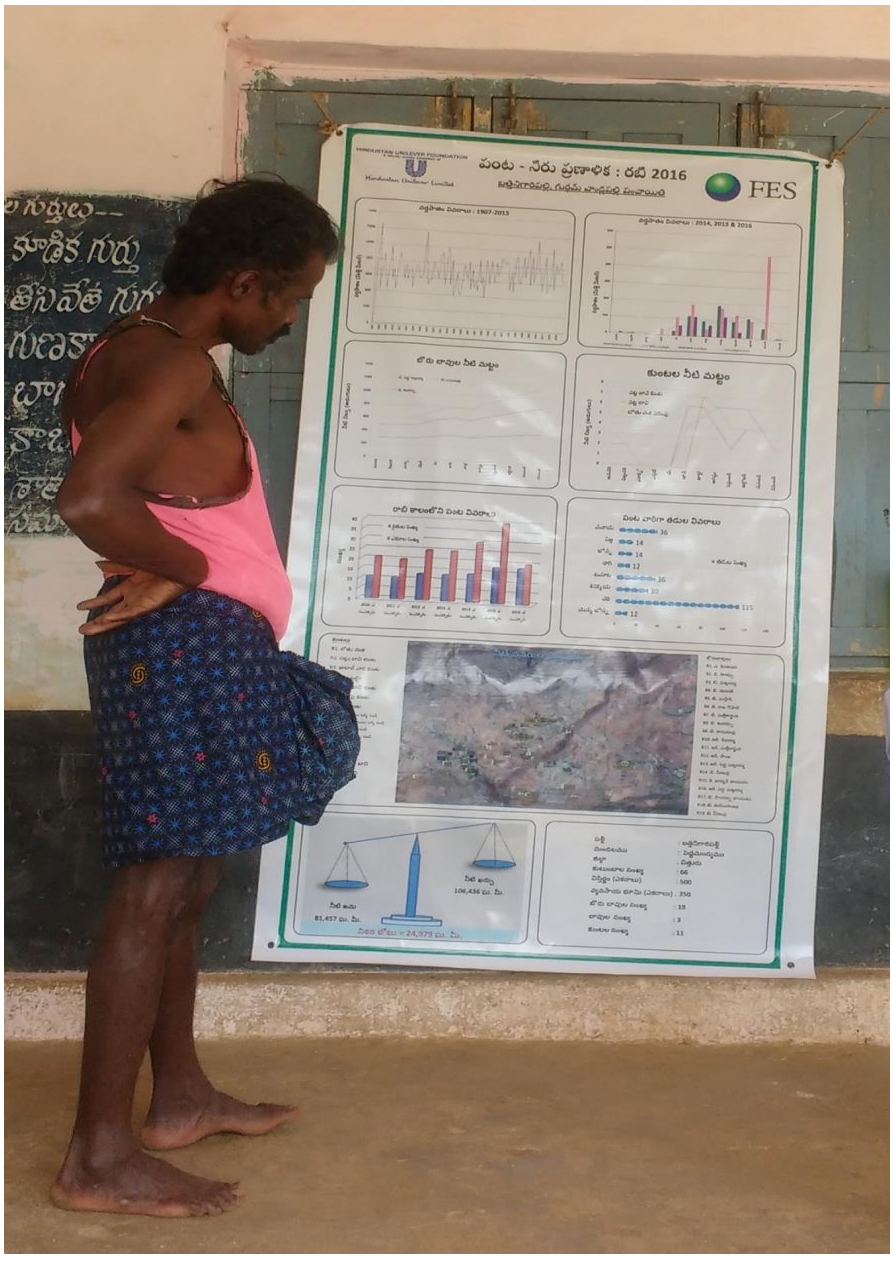
What is expected from the discussion??

The expectations regarding irrigation water management from the discussion amongst the community are-

- To change their crop plan for the Rabi season
- To change cropping practices & irrigation methods
- To evolve rules & regulations for usage of water.

If there is change in crops/ and practices, the revised crop plan is filled in the Sheet no. 10 and we would get the estimation of total water available & revised requirement for Rabi season in the next sheet i.e. sheet no. 11, which would also be depicted in pictorial form and developed as flex sheet or chart.

The dashboard & sheet/ chart depicting revised crop plan should be hanged or pasted at any common place where all of the villagers can see and discuss around the issues presented.



Notes

Notes

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FES

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