WRMIS User Manual

SEASONAL PLANNING

DEVELOPMENT OF WATER RESOURCES MANAGEMENT INFORMATION SYSTEM (WRMIS) AND DECISION SUPPORT SYSTEM (DSS)

NESPAK

Version 1.0

August 23, 2016

Revision History

Version	Date	By	Summary of Changes
1.0	23-Aug-16	NESPAK	Initial Draft

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1. Seasonal Planning

This module provides an interface to Calculate probability for the upcoming season and view already created probability for the past years of Indus at Tarbela, Jhelum at Mangla, Chenab at Marala and Kabul at Nowshera. This module also provides a module for forecasting inflows on above mention reaches. Snow Run Model is utilized for the forecasted inflows of Indus at Mangla and Kabul at Nowshera. Probability Table and Forecasted Inflows are used to plan the upcoming season into seasonal planning module where shortages of reservoirs are kept to be same by changing some factors. After balancing reservoirs system generates a plan which creates six different reports

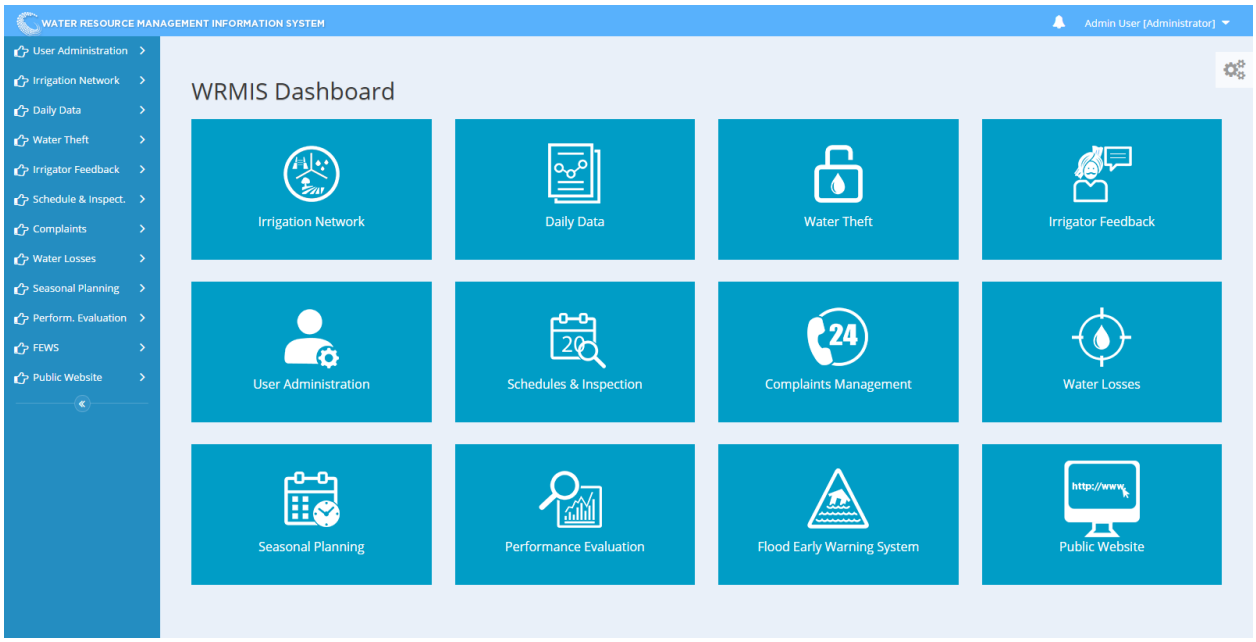
1.1 Seasonal Planning Reference Data

This module provides an interface to add reference data that has to be used into seasonal Planning.

Business User: Administrator

Any other user can access “Seasonal Planning” based on assigned rights from Roles and Rights (User Administration)

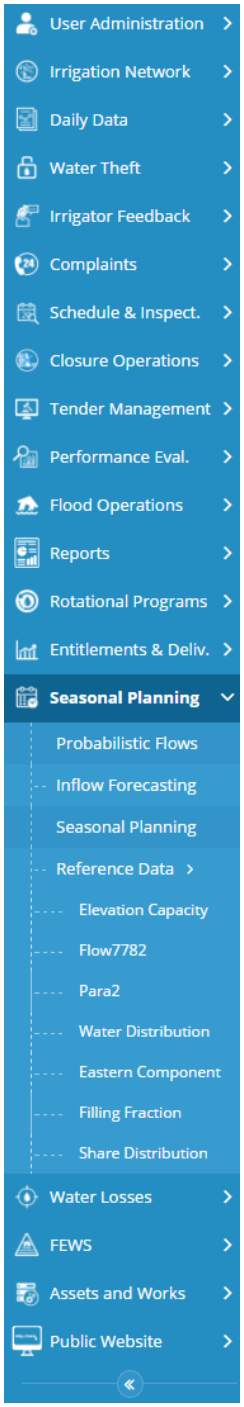
Pre-Requisite: Filling Fraction should be already created before adding new filling fraction.

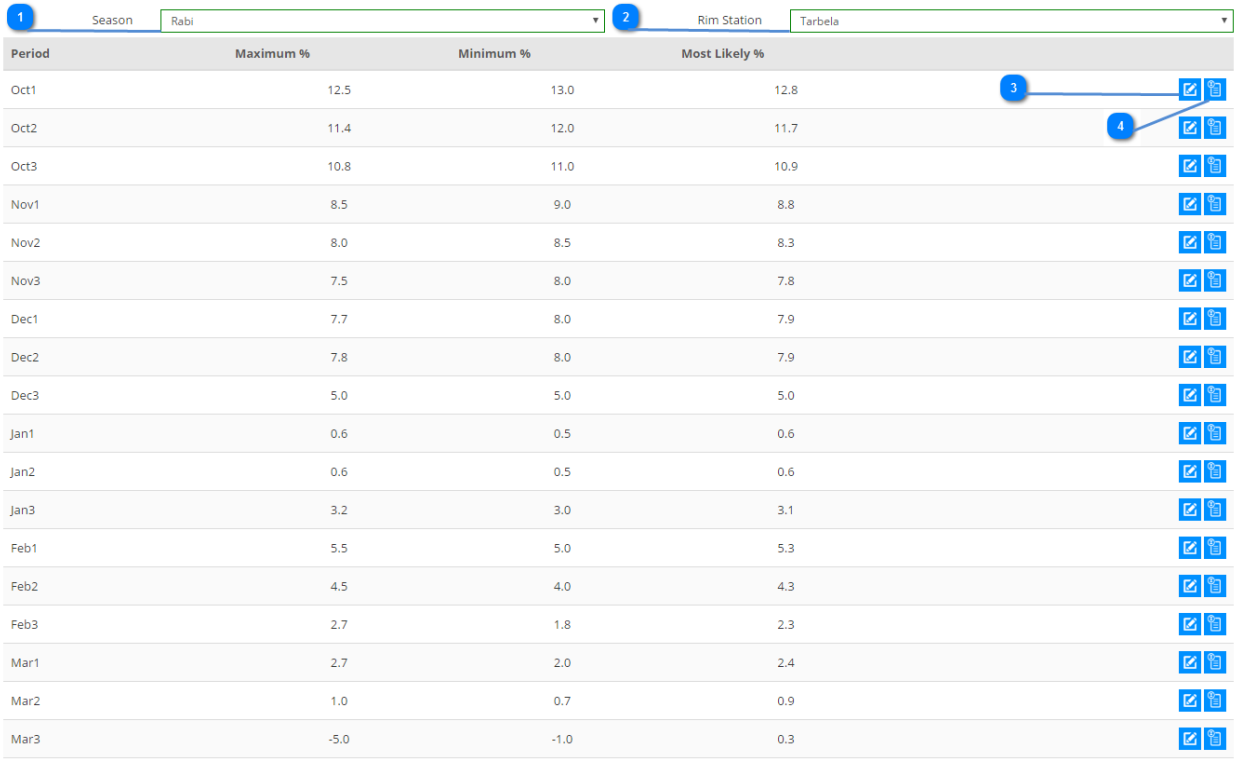


1.2 Filling Fraction

This module provides an interface to add/edit filling fraction as a reference data that has to be used into seasonal Planning.

How to Access: Main Menu -> Seasonal Planning - > Filling Fraction





Period	Maximum %	Minimum %	Most Likely %
Oct1	12.5	13.0	12.8
Oct2	11.4	12.0	11.7
Oct3	10.8	11.0	10.9
Nov1	8.5	9.0	8.8
Nov2	8.0	8.5	8.3
Nov3	7.5	8.0	7.8
Dec1	7.7	8.0	7.9
Dec2	7.8	8.0	7.9
Dec3	5.0	5.0	5.0
Jan1	0.6	0.5	0.6
Jan2	0.6	0.5	0.6
Jan3	3.2	3.0	3.1
Feb1	5.5	5.0	5.3
Feb2	4.5	4.0	4.3
Feb3	2.7	1.8	2.3
Mar1	2.7	2.0	2.4
Mar2	1.0	0.7	0.9
Mar3	-5.0	-1.0	0.3

Filling Fraction

1

Season

- Select season from the ‘Season’ dropdown.
- On selection of Season, system enables Rim Station dropdown and populates all Rim Stations based on selected Season.

2

Rim Stations

- Select Rim Station from the ‘Rim Station’ dropdown.
- On selection of Rim Station, relevant data is populated.

3 **Edit**

- Click on 'Edit' button to edit the existing record.
- System takes the user to edit page with pre-populated record of respective field

4 **Change History**

- Click on < History> image to view the change history against that specific record.

5 **Save**

- Click on 'Save' image, system verify all the required fields.
- System saves the data into the database & displays a message "Records saved successfully".
- System display error message if any of the required fields has not been entered.
- System displays newly added record into the Table.

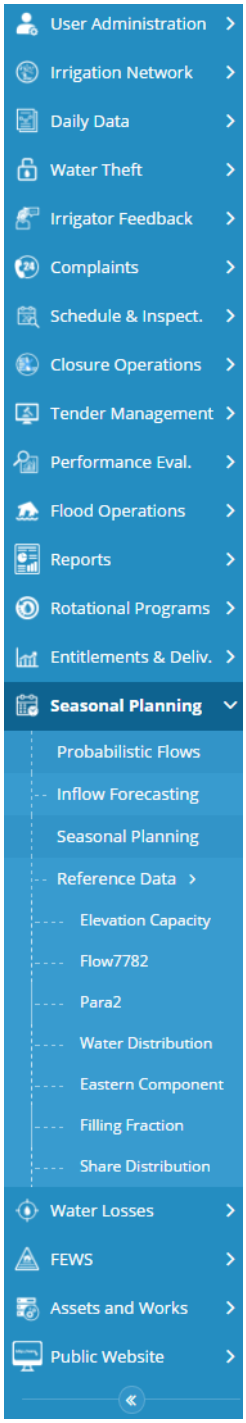
6 **Cancel**

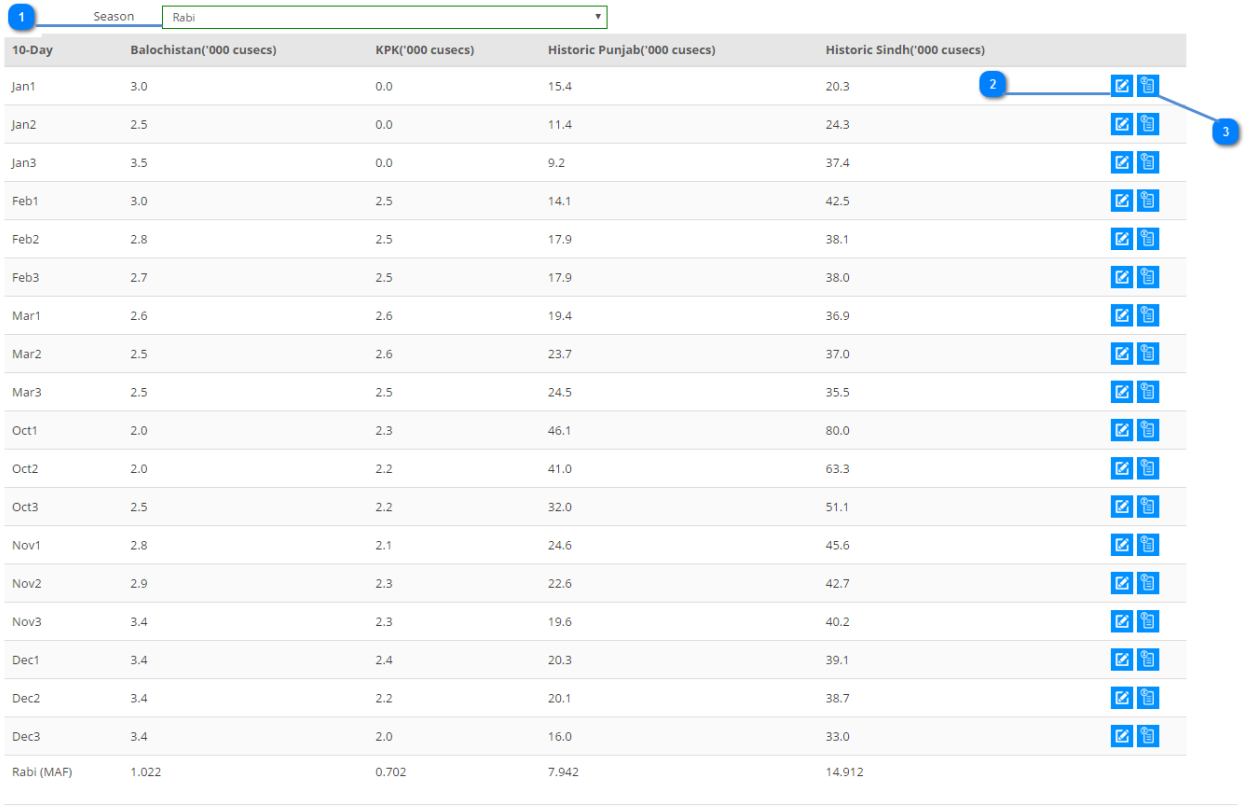
- By clicking on the Cancel image, system moves the user to Zone page without saving the record.

1.3 Share Distribution

This module provides an interface to add/edit Share Distribution as a reference data that has to be used into seasonal Planning.

How to Access: Main Menu -> Seasonal Planning - > Share Distribution





10-Day	Balochistan('000 cusecs)	KPK('000 cusecs)	Historic Punjab('000 cusecs)	Historic Sindh('000 cusecs)
Jan1	3.0	0.0	15.4	20.3
Jan2	2.5	0.0	11.4	24.3
Jan3	3.5	0.0	9.2	37.4
Feb1	3.0	2.5	14.1	42.5
Feb2	2.8	2.5	17.9	38.1
Feb3	2.7	2.5	17.9	38.0
Mar1	2.6	2.6	19.4	36.9
Mar2	2.5	2.6	23.7	37.0
Mar3	2.5	2.5	24.5	35.5
Oct1	2.0	2.3	46.1	80.0
Oct2	2.0	2.2	41.0	63.3
Oct3	2.5	2.2	32.0	51.1
Nov1	2.8	2.1	24.6	45.6
Nov2	2.9	2.3	22.6	42.7
Nov3	3.4	2.3	19.6	40.2
Dec1	3.4	2.4	20.3	39.1
Dec2	3.4	2.2	20.1	38.7
Dec3	3.4	2.0	16.0	33.0
Rabi (MAF)	1.022	0.702	7.942	14.912

Share Distribution

1

Season

- Select season from the 'Season' dropdown.
- On selection of Rim Station, relevant data is populated.

2

Edit

- Click on 'Edit' button to edit the existing record.
- System takes the user to edit page with pre-populated record of respective field.

3

Change History

- Click on < History> image to view the change history against that specific

record.

4 **Save**

- Click on ‘Save’ image, system verify all the required fields.
- System saves the data into the database & displays a message “Records saved successfully”.
- System display error message if any of the required fields has not been entered.
- System displays newly added record into the Table.

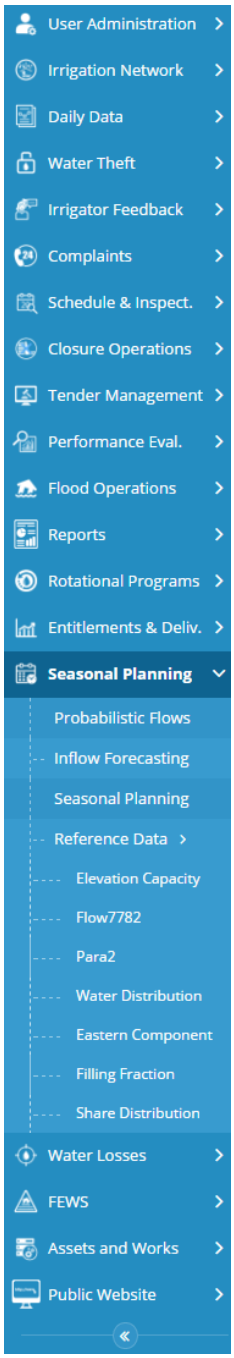
5 **Cancel**

- By clicking on the Cancel image, system moves the user to Zone page without saving the record.

1.4 Para 2

This module provides an interface to view flows of Para 2 as a reference data that has to be used into seasonal Planning.

How to Access: Main Menu -> Seasonal Planning - > Para 2

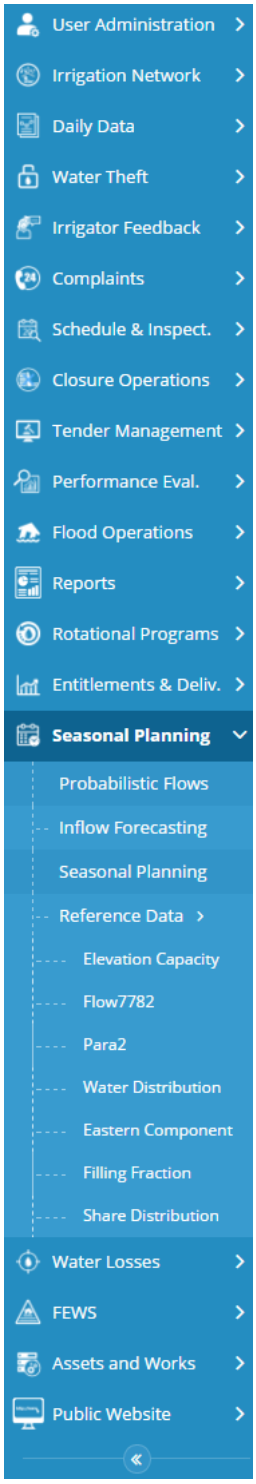


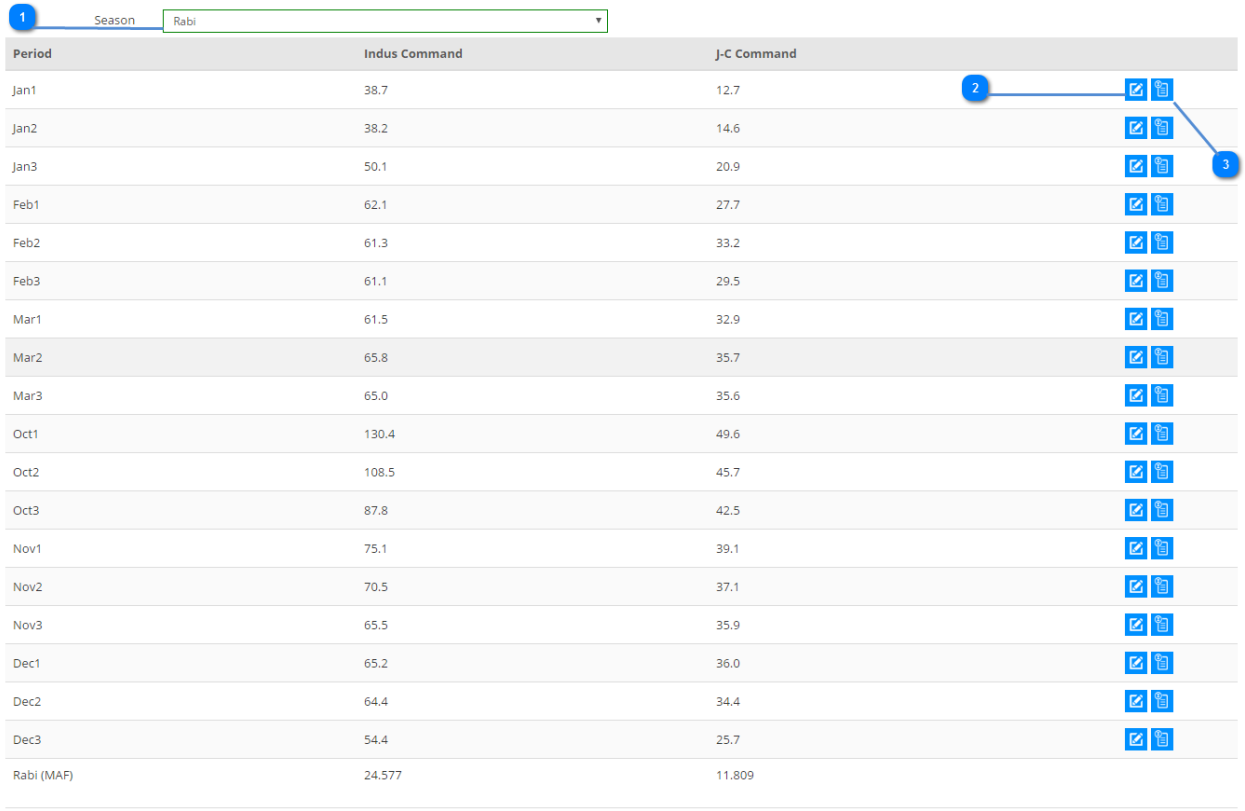
Period	Indus Command Para2
Apr1	68.2
Apr2	70.1
Apr3	79.1
May1	99.6
May2	116.5
May3	135.3
Jun1	162.8
Jun2	187.2
Jun3	198.7
Jul1	204.2
Jul2	185.4
Jul3	175.9
Aug1	170.3
Aug2	169.3
Aug3	175.7
Sep1	177.3
Sep2	175.1
Sep3	170.1
EK (MAF) LK (MAF) Total (MAF)	14.779 40.153 54.932

1.5 Flows 1977-82

This module provides an interface to add/edit flows of 1977-82 as a reference data that has to be used into seasonal Planning.

How to Access: Main Menu -> Seasonal Planning - > Flow7782





Period	Indus Command	J-C Command
Jan1	38.7	12.7
Jan2	38.2	14.6
Jan3	50.1	20.9
Feb1	62.1	27.7
Feb2	61.3	33.2
Feb3	61.1	29.5
Mar1	61.5	32.9
Mar2	65.8	35.7
Mar3	65.0	35.6
Oct1	130.4	49.6
Oct2	108.5	45.7
Oct3	87.8	42.5
Nov1	75.1	39.1
Nov2	70.5	37.1
Nov3	65.5	35.9
Dec1	65.2	36.0
Dec2	64.4	34.4
Dec3	54.4	25.7
Rabi (MAF)	24.577	11.809

1

Season

- Select season from the ‘Season’ dropdown.
- On selection of Rim Station, relevant data is populated.

2

Edit

- Click on ‘Edit’ button to edit the existing record.
- System takes the user to edit page with pre-populated record of respective field.

3

Change History

- Click on < History> image to view the change history against that specific record.

4 **Save**

- Click on ‘Save’ image, system verify all the required fields.
- System saves the data into the database & displays a message “Records saved successfully”.
- System display error message if any of the required fields has not been entered.
- System displays newly added record into the Table.

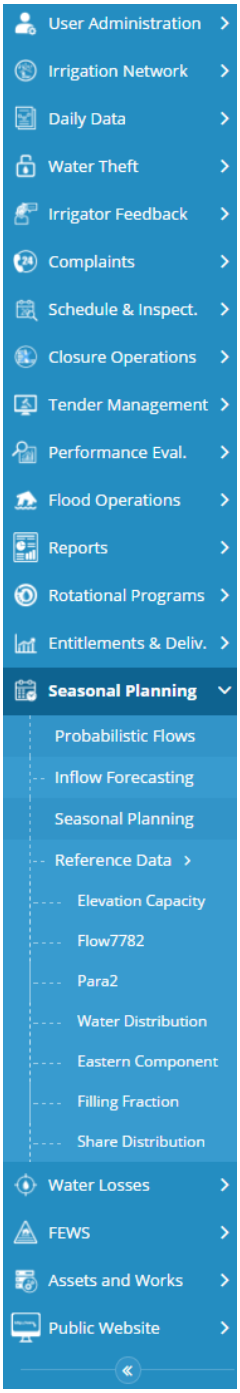
5 **Cancel**

- By clicking on the Cancel image, system moves the user to Zone page without saving the record.

1.6 Water Distribution

This module provides an interface to view percentages of Water Distribution as a reference data that has to be used into seasonal Planning.

How to Access: Main Menu -> Seasonal Planning - > Water Distribution

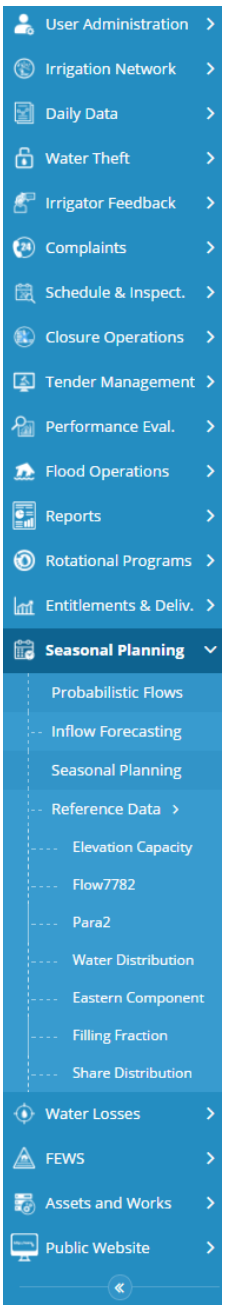


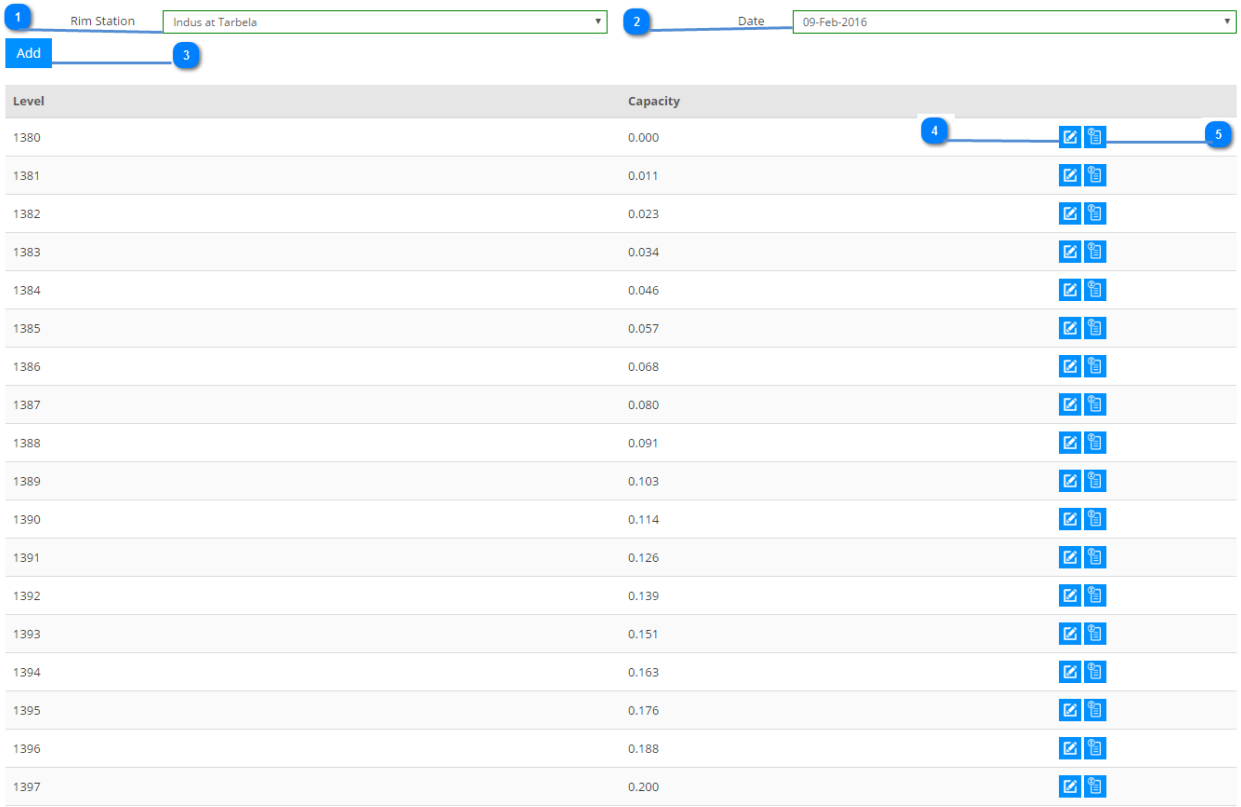
Period	0%	5%	10%	15%	20%	25%	30%
Apr1	34.4	29.5	24.0	24.0	24.0	24.0	24.0
Apr2	37.6	30.4	26.0	26.0	26.0	26.0	26.0
Apr3	44.5	40.0	33.2	33.2	33.2	33.2	33.2
May1	49.5	49.5	49.5	32.9	32.9	32.9	32.9
May2	52.1	52.1	52.1	52.1	35.4	35.4	35.4
May3	54.3	54.3	54.3	54.3	54.3	39.0	39.0
Jun1	55.7	55.7	55.7	55.7	55.7	55.7	39.0
Jun2	57.7	57.7	57.7	57.7	36.0	30.0	30.0
Jun3	59.4	59.4	59.4	59.4	59.4	59.4	49.0
Jul1	59.5	59.5	59.5	59.5	59.5	59.5	49.0
Jul2	54.5	54.5	54.5	54.5	54.5	54.5	49.0
Jul3	52.5	52.5	52.5	52.5	52.5	52.5	50.0
Aug1	53.1	53.1	53.1	53.1	53.1	53.1	50.0
Aug2	58.7	58.7	58.7	58.7	58.7	48.7	48.7
Aug3	62.1	62.1	62.1	38.0	34.0	30.0	30.0
Sep1	61.4	53.5	41.0	37.0	34.0	30.0	30.0
Sep2	60.3	48.0	39.0	37.0	34.0	30.0	30.0
Sep3	57.2	45.0	34.0	34.0	34.0	30.0	30.0

1.7 Elevation Capacity

This module provides an interface to view percentages of Water Distribution as a reference data that has to be used into seasonal Planning.

How to Access: Main Menu -> Seasonal Planning - > Elevation Capacity





Level	Capacity
1380	0.000
1381	0.011
1382	0.023
1383	0.034
1384	0.046
1385	0.057
1386	0.068
1387	0.080
1388	0.091
1389	0.103
1390	0.114
1391	0.126
1392	0.139
1393	0.151
1394	0.163
1395	0.176
1396	0.188
1397	0.200

1

Rim Stations

- Select Rim Station from the 'Rim Station' dropdown.
- On selection of Rim Station, relevant date is populated.

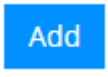
2

Date

- Auto fetched from database

3

Add



- Click on <Add> button add the selected record for the selected Rim station.

4

Edit

- Click on 'Edit' button to edit the existing record.
- System takes the user to edit page with pre-populated record of respective field.

5 **Change History**

- Click on < History> image to view the change history against that specific record.

6 **Save**

- Click on 'Save' image, system verify all the required fields.
- System saves the data into the database & displays a message "Records saved successfully".
- System display error message if any of the required fields has not been entered.
- System displays newly added record into the Table.

7 **Cancel**

- By clicking on the Cancel image, system moves the user to Zone page without saving the record.

1.8 Probabilistic Flows

This module provides an interface to Calculate, view Probability Table that has to be used into seasonal Planning and Inflow Forecasting.

Business User: Administrator

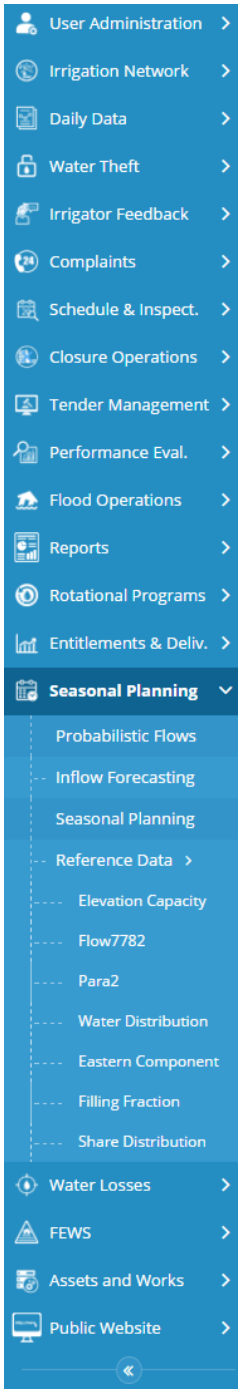
Any other user can access "Seasonal Planning" based on assigned rights from Roles and Rights (User Administration)

Pre-Requisite: 10 Daily flow data of the rim stations should be calculated and available into database.

1.9 View Probabilistic Flows

This module provides an interface to view already created probability of the following rim stations. i.e. Kabul at Nowshera, Indus at Terbella, Chenab at Marala and Jhelum at Mangla.

How to Access: Main Menu -> Seasonal Planning - > Probability



1 Rim Station: Indus at Tarbela
3 Season: Kharif
2 Year: 2016

Period	Maximum		5%		10%		15%		20%		25%		30%		35%		40%	
	Dis.	Vol.	Dis.	Vol.	Dis.	Vol.	Dis.	Vol.	Dis.	Vol.	Dis.	Vol.	Dis.	Vol.	Dis.	Vol.	Dis.	Vol.
Apr1	51.4	1.020	36.4	0.722	34.5	0.684	33.6	0.666	31.5	0.625	30.7	0.609	30.2	0.599	29.7	0.589	28.7	0.569
Apr2	52.5	2.061	44.9	1.613	42.8	1.533	38.3	1.426	37.5	1.369	36.0	1.323	35.4	1.301	34.7	1.277	34.1	1.245
Apr3	64.1	3.332	60.0	2.803	59.7	2.717	53.3	2.483	48.5	2.331	48.3	2.281	47.7	2.248	44.8	2.166	41.9	2.076
May1	98.8	5.292	89.4	4.576	78.8	4.280	76.5	4.000	65.5	3.630	62.6	3.523	59.5	3.428	57.7	3.310	55.9	3.185
May2	174.4	8.751	129.9	7.153	118.1	6.622	101.5	6.014	99.2	5.598	87.9	5.266	83.9	5.092	78.5	4.867	74.1	4.655
May3	176.1	12.593	159.5	10.633	133.7	9.539	119.4	8.619	117.4	8.159	109.1	7.646	108.2	7.453	105.6	7.171	99.7	6.830
Jun1	199.3	16.546	190.0	14.402	161.3	12.738	149.9	11.592	148.8	11.110	144.8	10.518	136.5	10.160	134.4	9.837	132.3	9.454
Jun2	271.1	21.923	258.2	19.523	222.2	17.145	213.7	15.831	181.4	14.708	174.6	13.981	167.1	13.474	162.3	13.056	154.8	12.524
Jun3	303.3	27.939	293.6	25.346	272.8	22.556	257.4	20.936	243.9	19.546	218.9	18.323	214.2	17.723	209.5	17.211	206.5	16.620
Jul1	380.7	35.490	323.4	31.761	307.9	28.663	278.7	26.464	260.2	24.707	258.3	23.446	242.4	22.531	227.0	21.713	221.9	21.021
Jul2	350.0	42.432	333.6	38.378	311.7	34.845	297.9	32.373	275.0	30.162	272.4	28.849	263.9	27.765	257.8	26.826	255.3	26.085
Jul3	369.1	50.485	345.0	45.905	333.3	42.117	298.4	38.884	294.7	36.592	284.8	35.063	278.5	33.841	256.4	32.420	253.2	31.609
Aug1	428.3	58.980	367.4	53.192	342.3	48.906	324.8	45.326	317.9	42.897	304.6	41.105	296.2	39.716	278.1	37.936	273.9	37.042
Aug2	404.4	67.001	300.3	59.148	283.4	54.527	276.0	50.800	268.0	48.213	266.7	46.395	255.3	44.780	238.5	42.667	237.1	41.745
Aug3	278.4	73.075	260.2	64.825	248.1	59.940	223.0	55.665	216.9	52.945	213.2	51.047	201.4	49.174	195.3	46.928	193.1	45.958
Sep1	230.9	77.655	205.2	68.895	198.1	63.869	185.0	59.334	172.9	56.374	163.3	54.286	150.0	52.149	146.8	49.840	142.2	48.778
Sep2	165.0	80.928	148.1	71.833	142.2	66.689	122.8	61.770	120.1	58.756	118.6	56.638	113.7	54.404	111.9	52.060	105.3	50.867
Sep3	121.4	83.336	90.1	73.620	83.1	68.337	81.5	63.387	78.9	60.321	75.8	58.141	75.4	55.900	74.8	53.544	72.7	52.309

Probabilistic Flows

1

Rim Stations

Indus at Tarbela

- Select Rim Station from the ‘Rim Station’ dropdown.
- On selection of Rim Station, relevant date is populated.

2

Season

Kharif

- Select season from the ‘Season’ dropdown.
- On selection of Rim Station, relevant data is populated.

3

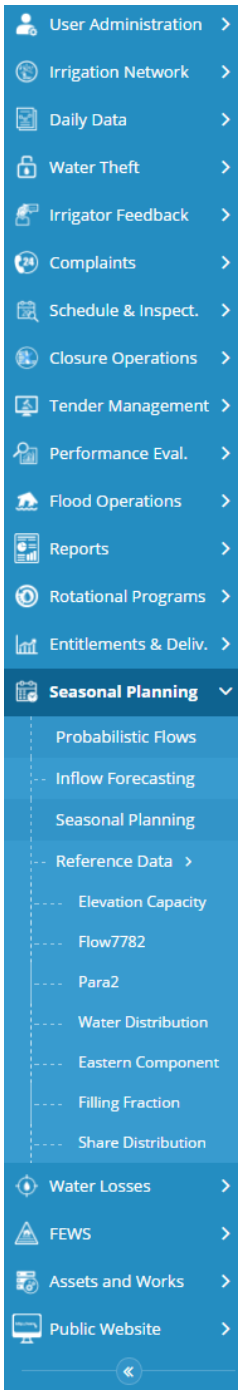
Year

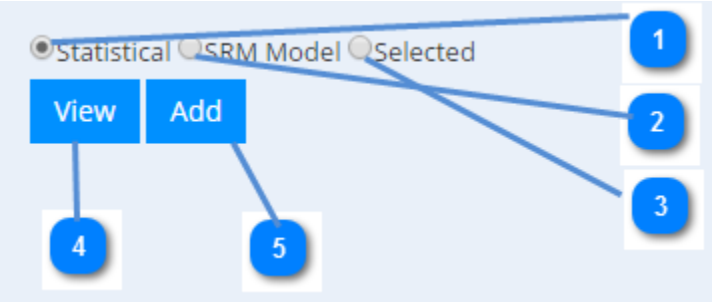
- Select Year from the ‘Year’ dropdown.
- On selection of Year, relevant data is populated.

1.10 Inflows Forecasting

This module provides an interface to forecast inflows of following reaches. i.e. Kabul at Nowshera, Indus at Terbella, Chenab at Marala and Jhelum at Mangla.

How to Access: Main Menu -> Seasonal Planning - > Probability





Probabilistic Flows

1 **Statistical**

Statistical

- Select Statistical option from the ‘Statistical’ radio button.

2 **SRM Model**

SRM Model

- Select SRM option from the ‘SRM Model’ radio button.

3 **Selected**

Selected

- Select selected option from the ‘Selected’ radio button.

4 **View**

View

- Click on <View> button to view selected Inflow Forecasting Draft.

5 **Add**

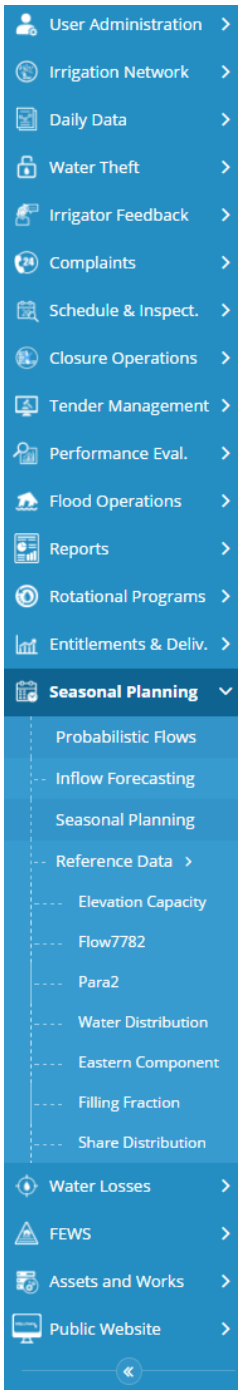
Add

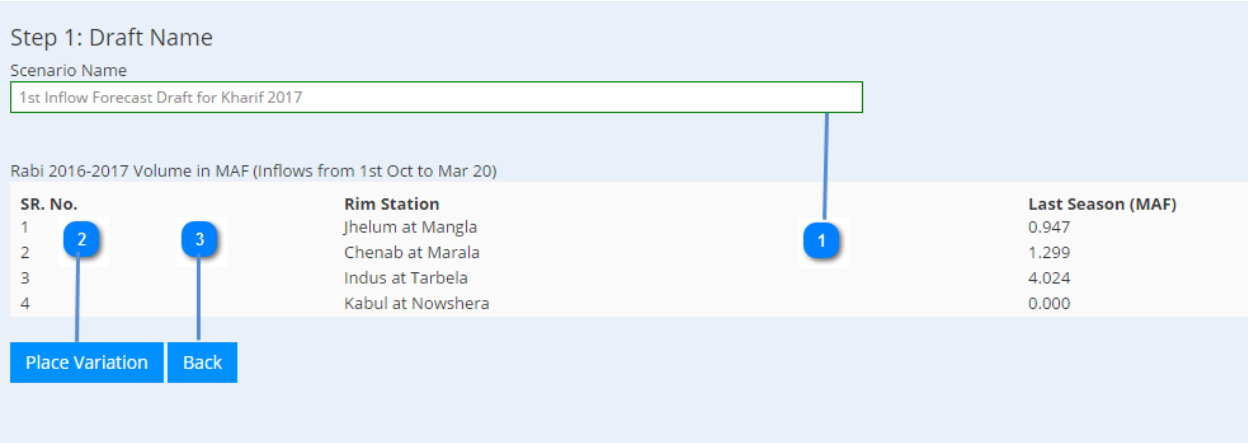
- Click on <Add> image to add a selected Inflow Forecasting Draft.

1.11 Statistical Inflows Forecasting

This module provides an interface to forecast inflows of following reaches. i.e. Kabul at Nowshera, Indus at Terbella, Chenab at Marala and Jhelum at Mangla.

How to Access: Main Menu -> Seasonal Planning - > Inflow Forecasting





Step 1: Add New Statistical Probabilistic Flows

1

Scenario Name

1st Inflow Forecast Draft for Kharif 2017

- Enter name for the new Statistical Inflow Forecasting draft.

2

Place Variation

Place Variation

- Click on <Place Variation> button to Place variations into newly created Inflow Forecasting Draft.

3

Back

Back

- Click on <Back> button to go back to Inflow Forecasting main screen.

Step 2: Place Variations into Statistical Probabilistic Flows

1

Starting Limit

- Enter Starting Limit into ‘Starting Limit’ User input field to place Variation against each row.

2

Ending Limit

5

- Enter Ending Limit into 'Ending Limit' User input field to place Variation against each row.

3

Match Inflows

Matching Inflows

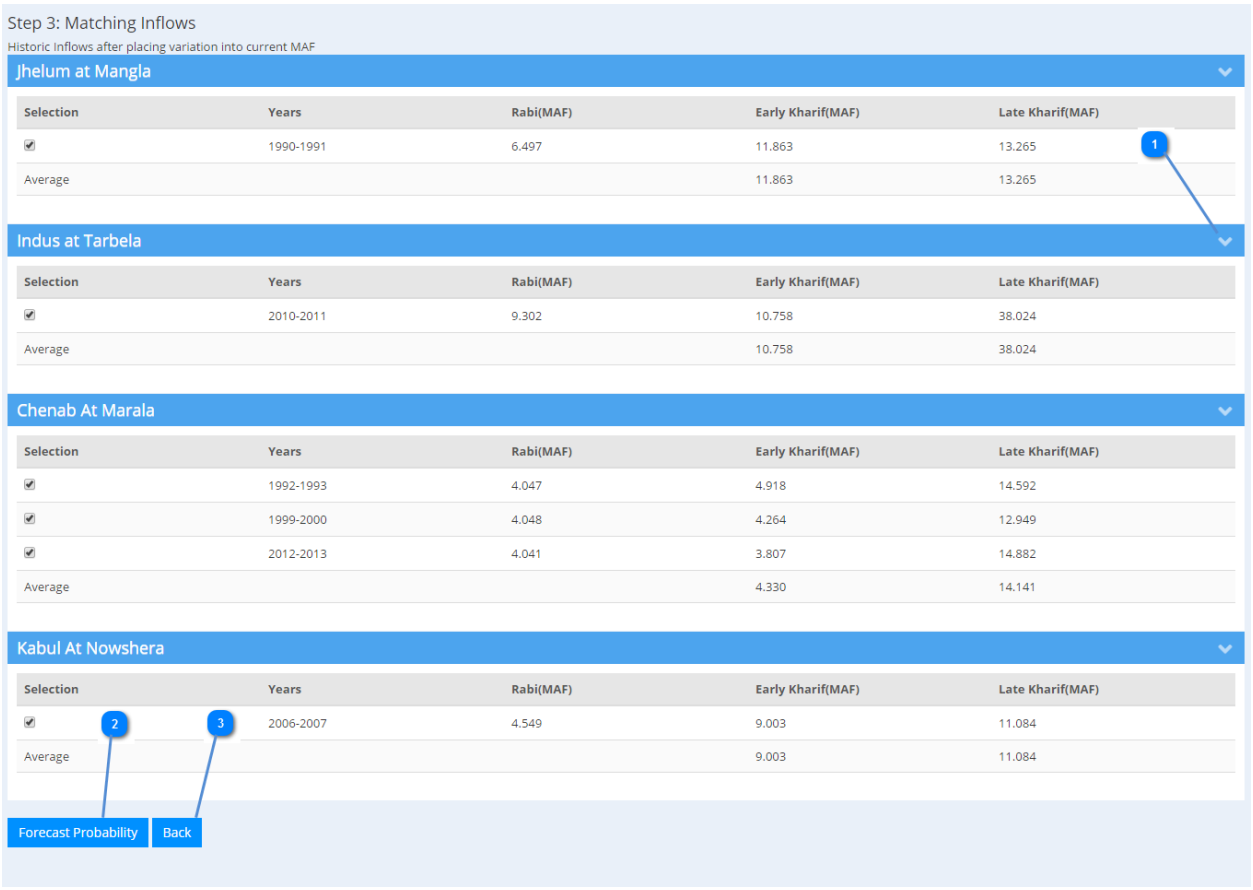
- Click on <Matching Inflows> button to match current Inflows with past record.

4

Back

Back

- Click on <Back> button to go back to Inflow Forecasting previous screen.

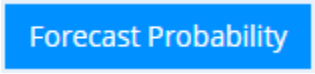


Step 3: Match Inflows into Statistical Probabilistic Flows

1 **Expendable panel button**

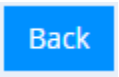
Click on Expendable panel button to expand/minimize the record.

2 **Forecast Probability**



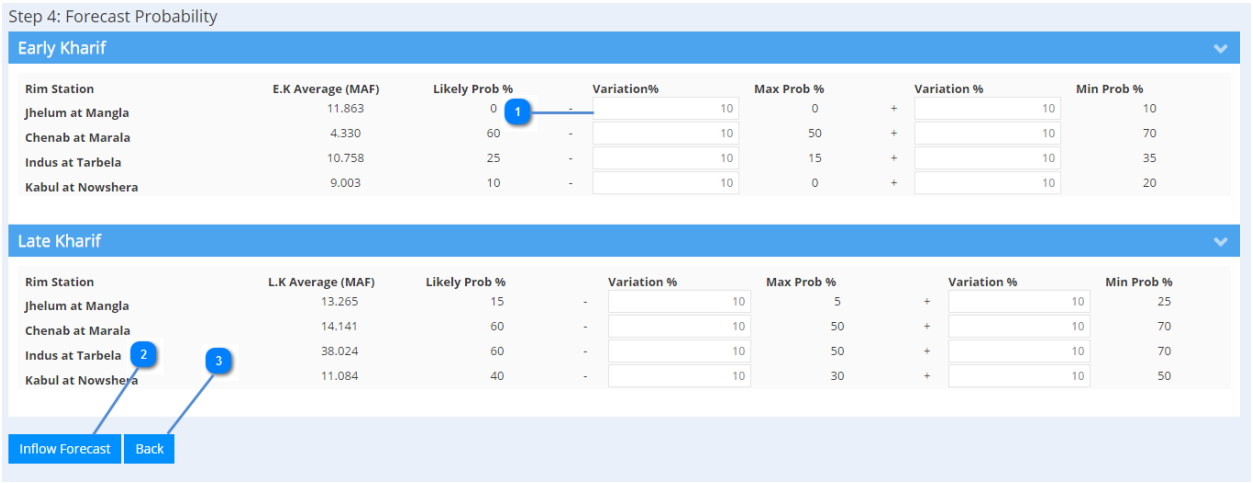
- Click on <Forecast Probability> button to navigate to Forecast Probability Page.

3 **Back**



- Click on <Back> button to go back to Inflow Forecasting previous screen.

.

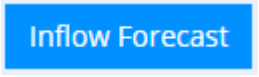


Step 4: Place Variations into Statistical Probabilistic Flows

1 **Variations**

- Enter Variations into variation field to change Max and Min Probability.

2 **Inflow Forecast**



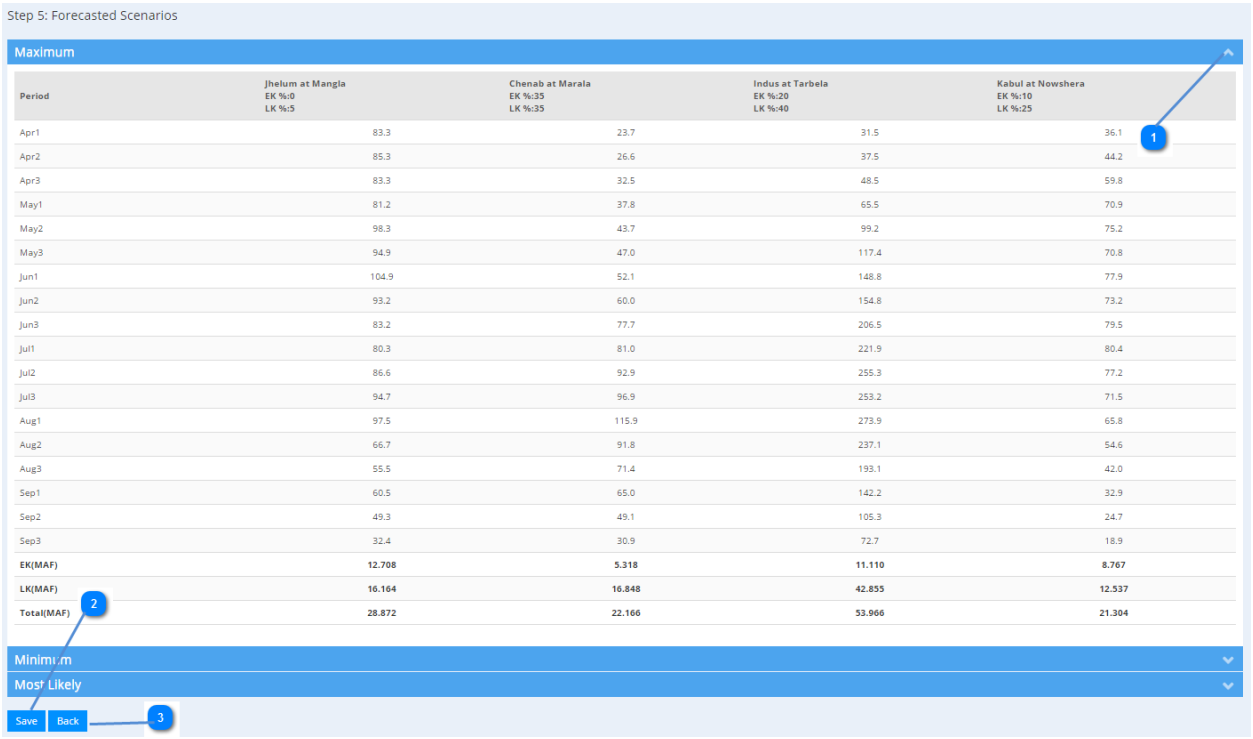
- Click on <Inflow Forecast> button to navigate to Inflow Forecast Page.

3

Back

Back

- Click on <Back> button to go back to Inflow Forecasting previous screen.



Step 5: Final Draft of Statistical Probabilistic Flows

1

Expendable panel button

Click on Expendable panel button to expand/minimize the record.

2

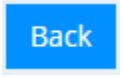
Save

Save

- Click on <Save> button.
- System saves the data into the database & displays a message “Records saved successfully”.

3

Back

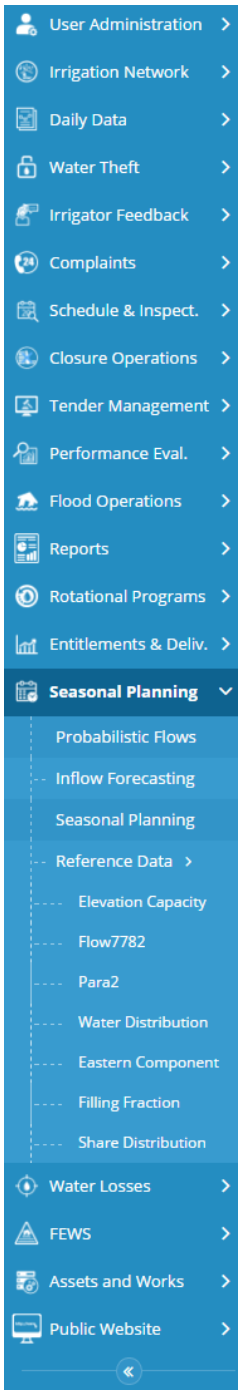


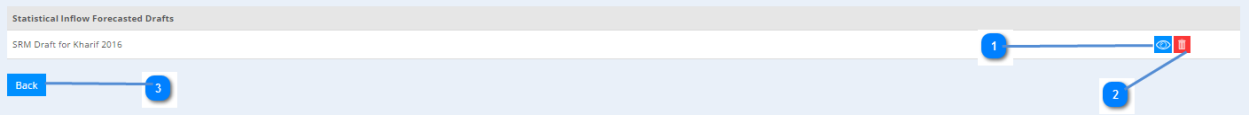
- Click on <Back> button to go back to Inflow Forecasting previous screen.

1.12 SRM Inflows Forecasting

This module provides an interface to forecast inflows of following reaches. i.e. Kabul at Nowshera, Indus at Terbella, Chenab at Marala and Jhelum at Mangla.

How to Access: Main Menu -> Seasonal Planning - > Inflow Forecasting





View Draft of SRM Probabilistic Flows

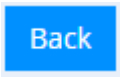
1 **View**

- Click on <View> image button to view selected draft.

2 **Delete**

- Click on 'Delete' image to delete the existing record.
- System display error message if any of the child entry has been entered for this specific record.
- System deletes the newly added record from the table.

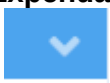
3 **Back**



- Click on <Back> button to go back to Inflow Forecasting previous screen.

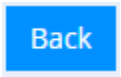
Final Draft of SRM Probabilistic Flows

1 **Expendable panel button**



- Click on Expendable panel button to expand/minimize the record.

2 **Back**



- Click on <Back> button to go back to Inflow Forecasting previous screen

Step 1: Add new Draft of SRM Probabilistic Flows

1 **Scenario Name**

- Enter name for the new SRM Inflow Forecasting draft.

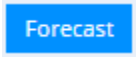
2 **E.K (MAF)**

- User Enter Early Kharif MAF value into ‘E.K (MAF)’ numeric field.

3 **L.K (MAF)**

- User Enter Late Kharif MAF value into ‘L.K (MAF)’ numeric field.

4 **Forecast**



- Click on <Forecast> button to forecast user entered flows.

- System navigate the user to the Forecast Inflows page.

5

Back

Back

- Click on <Back> button to go back to Inflow Forecasting previous screen.

Step 2: Final Draft of SRM Probabilistic Flows

1

Expendable panel button

- Click on Expendable panel button to expand/minimize the record.

2

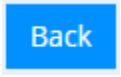
Save

Save

- Click on <Save> button.
- System saves the data into the database & displays a message “Records saved successfully”.

3

Back



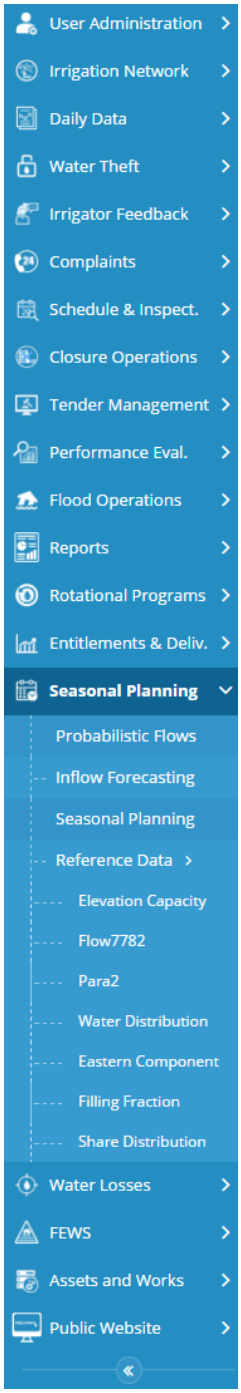
- Click on <Back> button to go back to Inflow Forecasting previous screen.

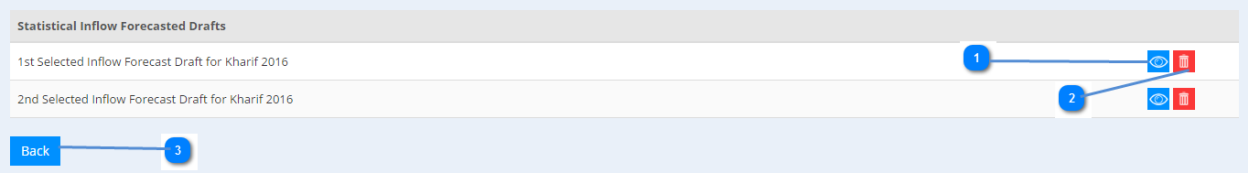
Note: SRM Model is for Kharif season only. In Rabi season Statistical Model will be selected as the Final Forecasted Draft.

1.13 Selected Inflows Forecasting

This module provides an interface to forecast inflows of following reaches. i.e. Kabul at Nowshera, Indus at Terbella, Chenab at Marala and Jhelum at Mangla.

How to Access: Main Menu -> Seasonal Planning - > Inflow Forecasting





View Draft of Selected Probabilistic Flows

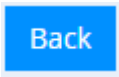
1 **View**

- Click on <View> image button to view selected draft.

2 **Delete**

- Click on 'Delete' image to delete the existing record.
- System display error message if any of the child entry has been entered for this specific record.
- System deletes the newly added record from the table.

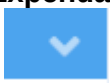
3 **Back**



- Click on <Back> button to go back to Inflow Forecasting previous screen.

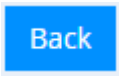
Selected Draft of Probabilistic Flows

1 **Expendable panel button**

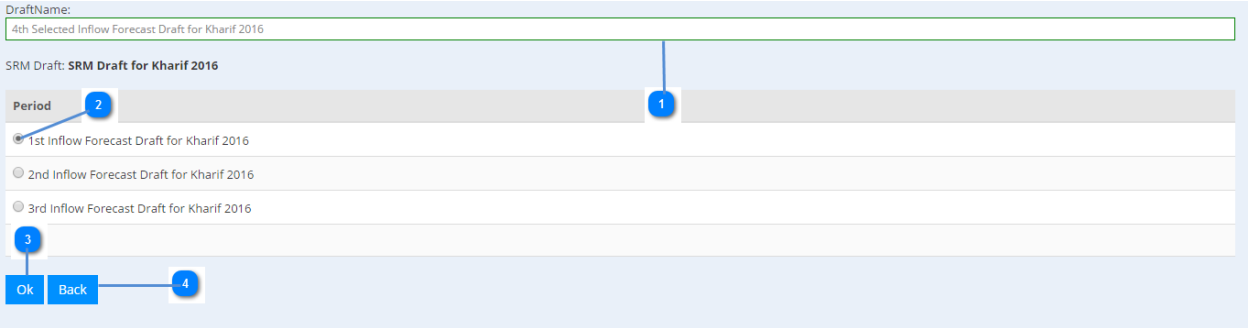


- Click on Expendable panel button to expand/minimize the record.

2 **Back**

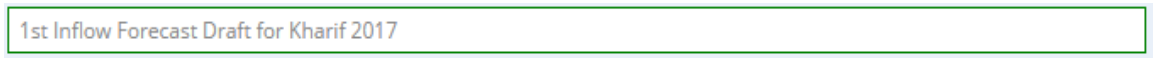


- Click on <Back> button to go back to Inflow Forecasting previous screen.



Step 1: Add new Draft of Selected Probabilistic Flows

1 **Scenario Name**

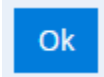


- Enter name for the new SRM Inflow Forecasting draft.

2 **Period**

- Select Inflow Forecasted draft from ‘Period’ radio button.

3 **Ok**



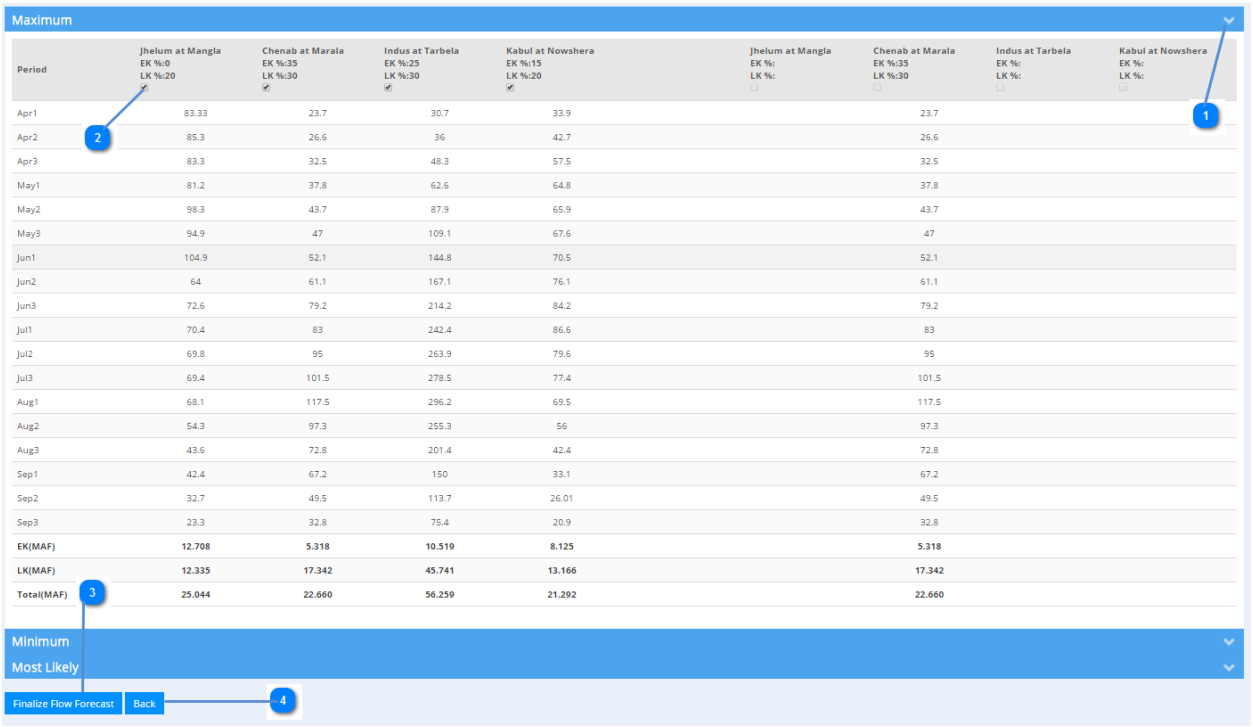
- Click on <Ok> button navigates the user to final selected draft of Inflow Forecasting.

4

Back

Back

- Click on <Back> button to go back to Inflow Forecasting previous screen.



Step 1: Add new Draft of Selected Probabilistic Flows

1

Scenario Name

1st Inflow Forecast Draft for Kharif 2017

- Enter name for the Final Inflow Forecasting draft.

2

Selection

- Click on check box to select respective Forecasted flow for the specific reach.

3

Finalize Flow Forecast

Finalize Flow Forecast

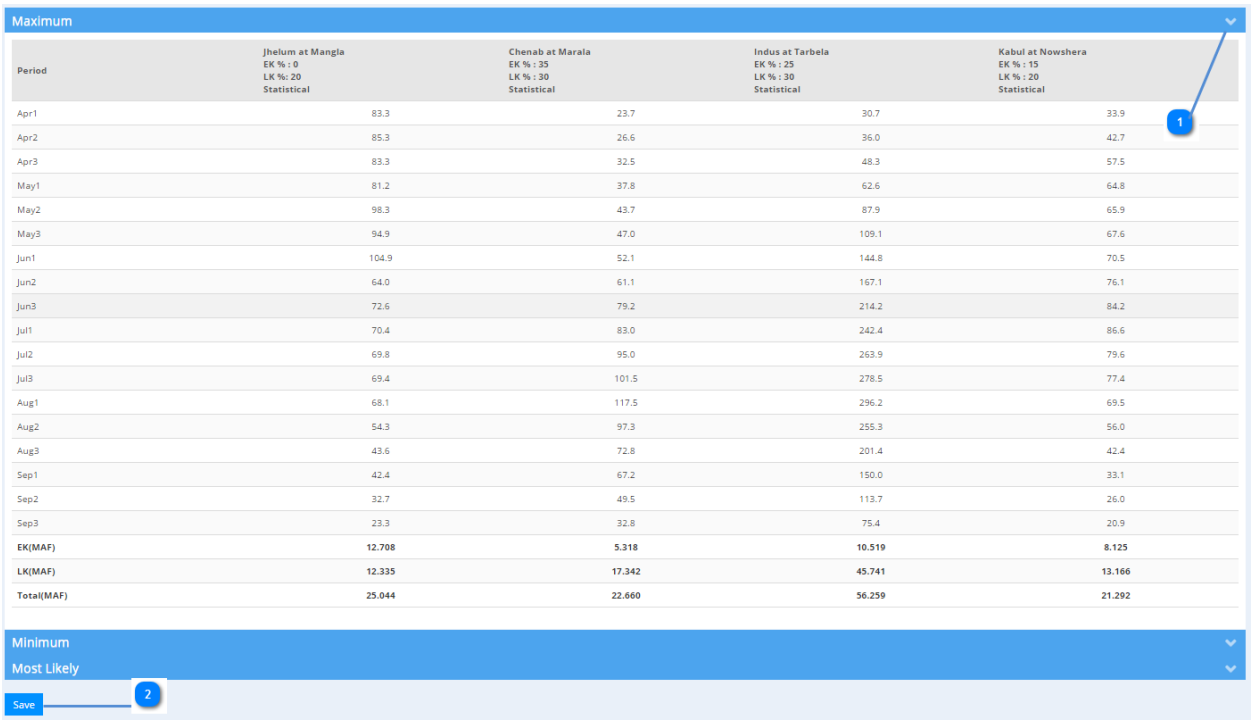
- Click on <Finalize Flow Forecast> button navigates the user to finalize draft of Inflow Forecasting.

4

Back

Back

- Click on <Back> button to go back to Inflow Forecasting previous screen.



Step 2: Final Draft of Selected Probabilistic Flows

1

Expendable panel button

- Click on Expendable panel button to expand/minimize the record.

2

Save

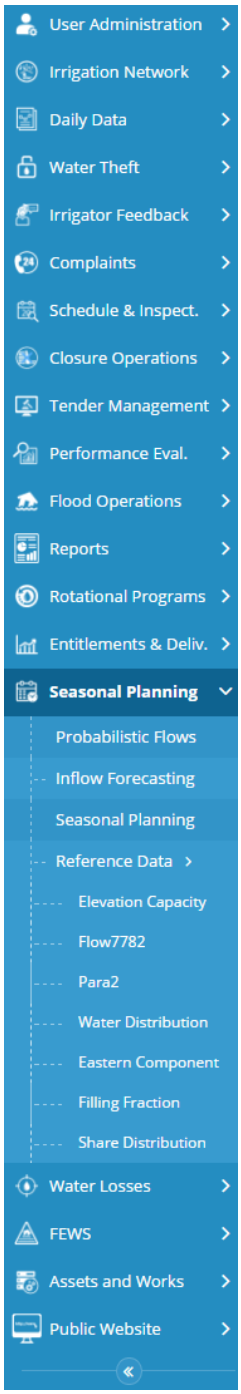
Save

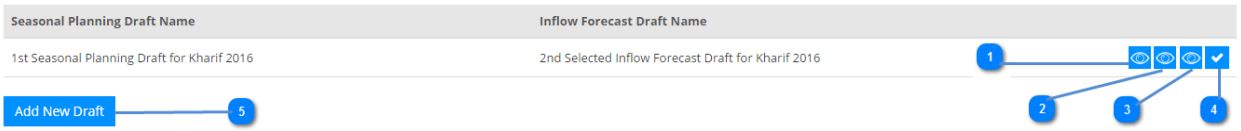
- Click on <Save> button.
- System saves the data into the database & displays a message “Records saved successfully”.

Seasonal Planning

This module provides an interface to plan upcoming season for following reaches. i.e. Indus Command and JC Command.

How to Access: Main Menu -> Seasonal Planning - > Seasonal Planning





Already Created Seasonal Plan

1 **Maximum**

- Click on <Maximum> button to view seasonal Plan with maximum inflows.

2 **Minimum**

- Click on <Minimum> button to view seasonal Plan with minimum inflows.

3 **Likely**

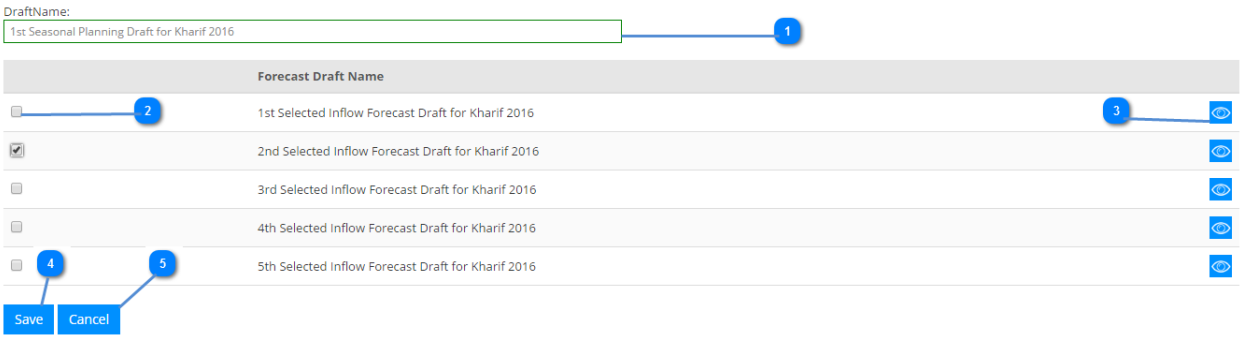
- Click on <Likely> button to view seasonal Plan with Likely inflows.

4 **Approve**

- Click on 'Approve' image button to Approve/un approve respective record.
- Once a record is approved system hides approve button for rest of the records.

5 **Add New Draft**

- Click on <Add New Draft> button to add new seasonal Planning Draft.



View Draft of Selected Probabilistic Flows

1

Scenario Name

1st Seasonal Planning Draft for Kharif 2016

- Enter name for the new seasonal Plan draft.

2

Select

- Select Inflow Forecasted draft from ‘select’ check box.

3

View

- Click on ‘view’ image button to view Inflow Forecasted draft.

4

Save

Save

- Click on <Save> button, system verify all the required fields.
- System saves the data into the database & displays a message “Records saved successfully”.
- System display error message if any of the required fields has not been entered.

5

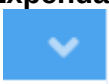
Cancel

Cancel

- Click on <Cancel> button to discard all the unsaved changes and navigates the user to the previous screen.

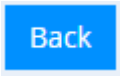
View selected Draft of Probabilistic Flows

1 **Expendable panel button**



- Click on Expendable panel button to expand/minimize the record.

2 **Back**



- Click on <Back> button to go back to Inflow Forecasting previous screen