Include CCF in Analysis

MSMA 2nd Edition · https://mes100.com/docs/include-ccf-in-analysis/

What is a Climate Change Factor (CCF)?

CCFs are values that were first introduced by the National Hydraulic Research Institute of Malaysia (NAHRIM) to add a certain percentage to the rainfall design as an effect of climate change.

For Peninsular Malaysia, the factors have been summarised and categorised into five regions, with statistical values of minimum, median, mean, and maximum tabulated for the East Coast and West Coast rainfall stations. According to the guideline Hydrological Procedure 1 (Revised and Updated 2015), the values that will be utilised in the design rainfall are the median values, which is deemed to be reasonable, not too high or too low compared to the mean of the maximum values of CCF.

Table 10.5: Summary of Minimum, Mean, Median and Maximum Values of Climate Change Factors for Region 5 (Wilayah Persekutuan)

State	No	Station ID	Station Name	Climate Change Factor							
				Return Period, T							
				2	5	10	20	25	50	100	200
Wilayah Persekutuan	1	3317001	Air Terjun Sg. Batu	1.04	1.14	1.21	1.26	1.28	1.33	1.37	1.42
	2	3217002	Emp. Genting Kelang	1.14	1.20	1.24	1.27	1.28	1.31	1.33	1.35
	3	3317004	Genting Sempah	1.12	1.20	1.25	1.30	1.31	1.34	1.38	1.41
	4	3217003	Ibu Bek. KM11, Gombak	1.04	1.11	1.14	1.18	1.18	1.21	1.23	1.25
	5	3217001	Ibu Bek. KM16, Gombak	1.11	1.14	1.16	1.18	1.18	1.20	1.21	1.22
	6	3116003	Ibu Pejabat JPS	1.06	1.11	1.14	1.16	1.16	1.18	1.20	1.21
	7	3116004	Ibu Pejabat JPS 1	1.08	1.16	1.20	1.23	1.24	1.28	1.30	1.33
	8	3217005	Kg. Kerdas, Gombak	1.09	1.19	1.25	1.30	1.31	1.35	1.39	1.42
	9	3217004	Kg. Kuala Seleh, H.Klg	1.12	1.21	1.26	1.30	1.31	1.34	1.37	1.40
	10	3216001	Kg. Sungai Tua	1.08	1.15	1.19	1.23	1.24	1.27	1.30	1.32
	11	3116006	Ladang Edinburgh	1.12	1.23	1.29	1.34	1.35	1.39	1.43	1.46
	12	3015001	Puchong Drop, K. Lumpur	1.10	1.14	1.17	1.19	1.19	1.21	1.22	1.24
	13	3216004	SK Jenis Keb, Kepong	1.00	1.11	1.17	1.22	1.24	1.29	1.33	1.37
	14	3116005	SK Taman Maluri	1.06	1.14	1.19	1.23	1.24	1.28	1.31	1.34
			Minimum	**1.09**	**1.15**	**1.20**	**1.23**	**1.24**	**1.29**	**1.32**	**1.35**
			Median	**1.09**	**1.15**	**1.20**	**1.23**	**1.24**	**1.29**	**1.32**	**1.35**
			Mean	**1.08**	**1.16**	**1.20**	**1.24**	**1.25**	**1.28**	**1.31**	**1.34**
			Maximum	**1.14**	**1.23**	**1.29**	**1.34**	**1.35**	**1.39**	**1.43**	**1.46**

Example of the CCF table for Region 5 for Peninsular Malaysia in HP1

As for the areas in Sabah and Sarawak, the 1-day CCF for each of the rainfall were calculated for all the ARIs, ranging from 2 to 100 years and the values are presented as per the table below which can be found in the ***Hydrological Procedure 26 – Estimation of Design Rainstorm in Sabah and Sarawak (Revised and Updated 2018)*** or on the ***Official Website of DID Sarawak***.

Table 7.1: 1-day CCF for Selected Rainfall Stations in Sabah.

No.	Station ID	Station Name	Climate Change Factor, CCF						
			Return Period, T						
			2	5	10	20	25	50	100
1	0850051RF (4278004)	Kuhara	1.16	1.22	1.24	1.26	1.26	1.27	1.29
2	0790011RF (4474002)	Kalabakan	1.13	1.19	1.21	1.23	1.24	1.25	1.27
3	0890011RF (4486001)	Semporna Airport	1.14	1.20	1.22	1.24	1.25	1.26	1.27
4	0750031RF (4563001)	Pensiangan	1.09	1.13	1.16	1.18	1.20	1.20	1.23
5	0750011RF (4764002)	Sapulut	1.09	1.13	1.17	1.19	1.19	1.21	1.22
6	1490021RF (4955001)	Sindumin	1.10	1.17	1.19	1.20	1.21	1.23	1.24
7	1460261RF (4959001)	Kemabong	1.09	1.13	1.16	1.19	1.19	1.21	1.23
8	1460271RF (4961001)	Bonor	1.08	1.13	1.16	1.18	1.19	1.20	1.22
9	1460171RF (5061001)	Kalampun	1.08	1.13	1.16	1.18	1.19	1.20	1.22
10	1040151RF (5074001)	Ulu Kuamut	1.10	1.17	1.19	1.21	1.22	1.23	1.25
11	0950011RF (5088002)	Tungku	1.14	1.20	1.22	1.24	1.25	1.26	1.28
12	1480041RF (5156001)	Mesapol	1.09	1.16	1.18	1.20	1.21	1.22	1.24
13	1460141RF (5158001)	Pangi Dam Site	1.08	1.14	1.17	1.19	1.19	1.21	1.22
14	1460031RF (5163002)	Sook	1.07	1.12	1.15	1.18	1.18	1.20	1.21
15	1010041RF (5181001)	Limkabong	1.13	1.19	1.21	1.23	1.24	1.25	1.27
16	1040061RF (5269001)	Tongod	1.13	1.18	1.21	1.23	1.23	1.25	1.26
17	1040021RF (5274001)	Kuamut Met. Stn.	1.14	1.20	1.22	1.25	1.23	1.27	1.28
18	1040181RF (5275001)	Balat	1.12	1.18	1.20	1.22	1.24	1.24	1.26
19	1450011RF (5353001)	Mempakul	1.09	1.16	1.18	1.20	1.21	1.23	1.24
20	1460011RF (5357003)	Beaufort JPS	1.09	1.13	1.17	1.19	1.20	1.21	1.23
21	1460061RF (5361002)	Keningau Met. Stn.	1.08	1.13	1.16	1.18	1.19	1.21	1.22
22	1460161RF (5364002)	Tulid	1.07	1.12	1.15	1.17	1.17	1.19	1.20
23	1040161RF (5372001)	Tangkulap	1.10	1.18	1.19	1.21	1.22	1.24	1.25
24	1460071RF (5462001)	Apin Apin	1.13	1.16	1.18	1.17	1.20	1.22	1.20
25	1460281RF (5465001)	Sinua At Sabah	1.13	1.16	1.19	1.19	1.21	1.23	1.20
26	1040111RF (5482001)	Bilit	1.13	1.19	1.21	1.23	1.24	1.25	1.26
27	1420011RF (5558001)	Bongawan	1.08	1.13	1.16	1.18	1.19	1.21	1.22
28	1040101RF (5582001)	Sukau	1.13	1.19	1.21	1.23	1.24	1.26	1.27

Example of CCF table for Sabah and Sarawak in HP 26

Steps to include CCF in software

In our software, the CCF value is automatically included in the computation of the rainfall intensities for **Drain analysis** for newly created projects.

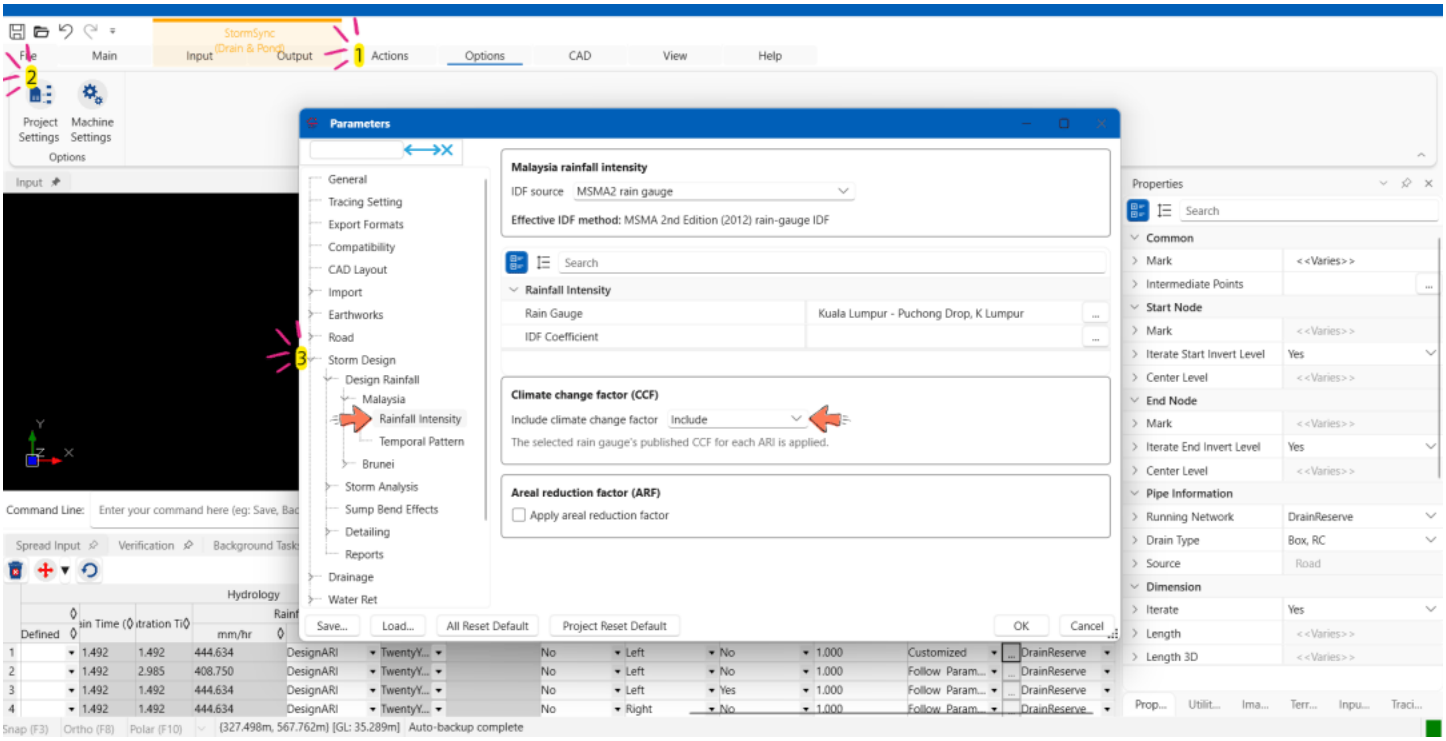
As for the **MSMA analysis**, similarly to the existing projects, the inclusion of the CCF needs to be enabled by the users under the Project Parameters.

Kindly note that this feature can be included or excluded in the analysis.

For StormSync (Drain & Pond) Module

Options > Project Settings > Expand Storm Design > Expand Design Rainfall > Malaysia > Rainfall Intensity > Climate Change Factor (CCF)

CCF inclusion option sits beside the IDF source on the Rainfall Intensity page. For a Brunei project, use *Design Rainfall > Brunei > Rainfall Intensity* instead. The same setting is also on the RHS Properties tab, under the **Rainfall Intensity** section as **CCF Inclusion**.



Project Settings for StormSync Module

Which factor MiTS applies depends on the selected IDF source:

- **MSMA2 rain gauge:** the gauge's published CCF.
- **Gridded HP1 / HP26:** HP26 uses the factor published for the selected grid and ARI; HP1 uses the median factor for the selected HP1 CCF region.
- **User λ, κ, θ, η coefficients:** the CCF entered with each coefficient set.
- **MSMA 1st Edition:** no CCF is published or applied.

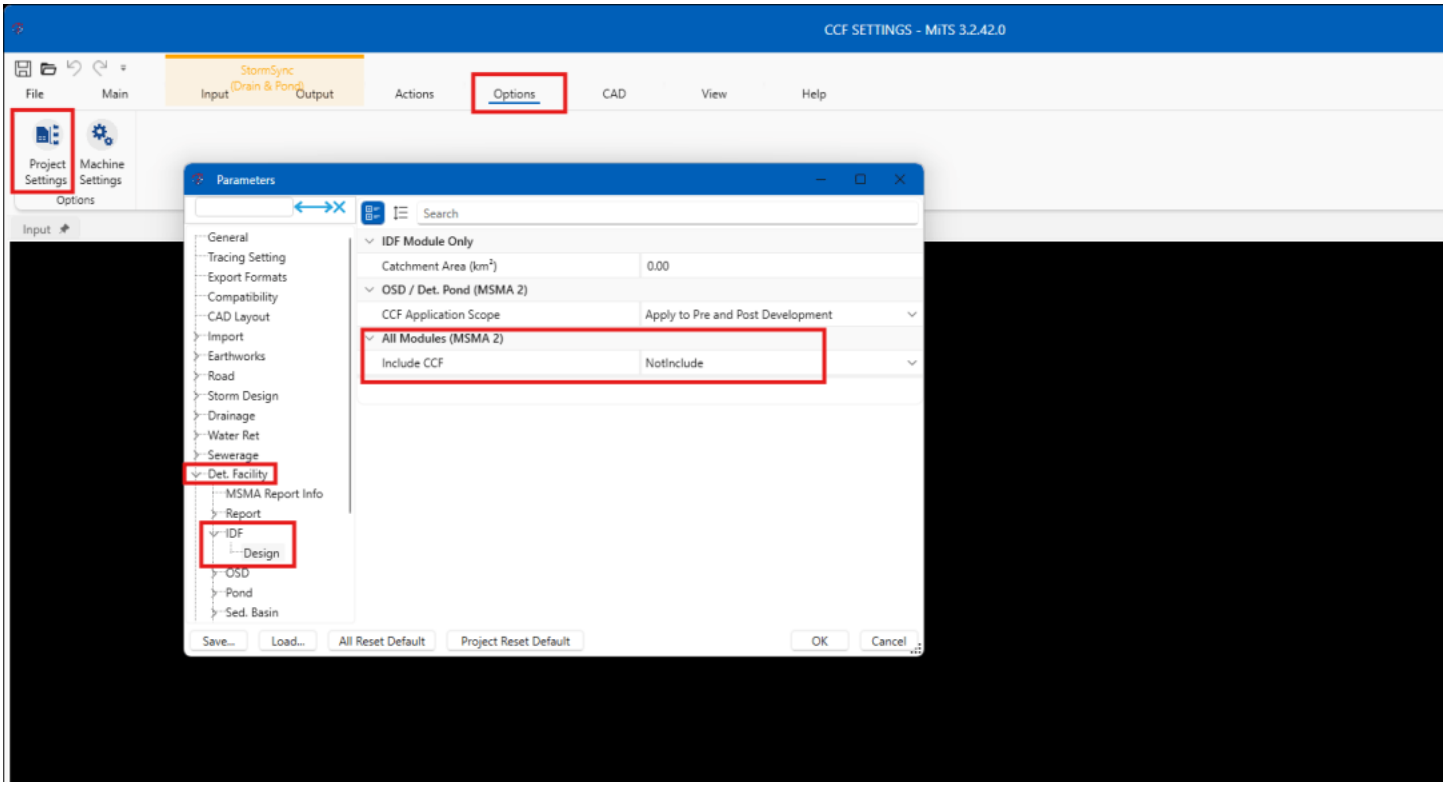
Published gauge and grid values are not edited in place. To use a different coefficient or CCF, select User coefficients and enter the values there.

Changing or Updating the CCF value

For the steps, see **Modifying CCF or IDF Coefficient in MiTS 2 and MiTS 3**.

For HydroCalc (MSMA) Module

Options > Project Parameters > Det. Facility > IDF > Design > Include CCF



Project Parameters for HydroCalc (MSMA) Module

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I’m the Benevolent Dictator for Life for MiTS Software cum Editor of this website. Read more here.

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