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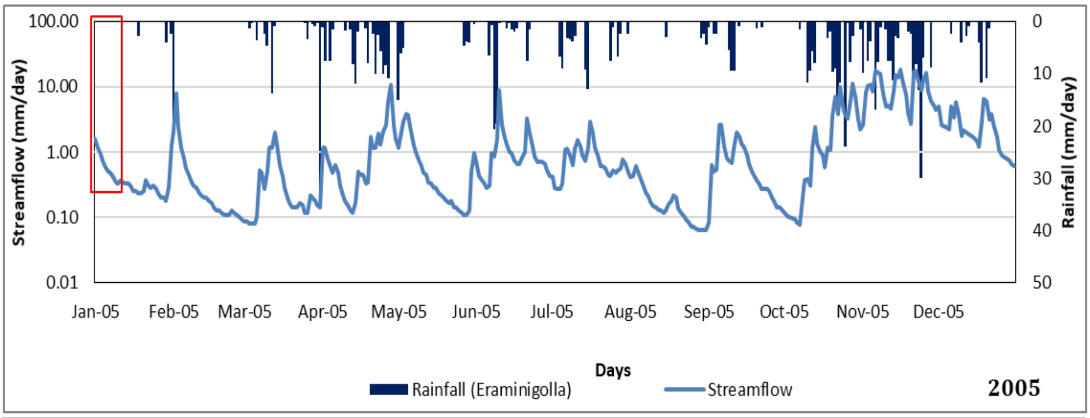
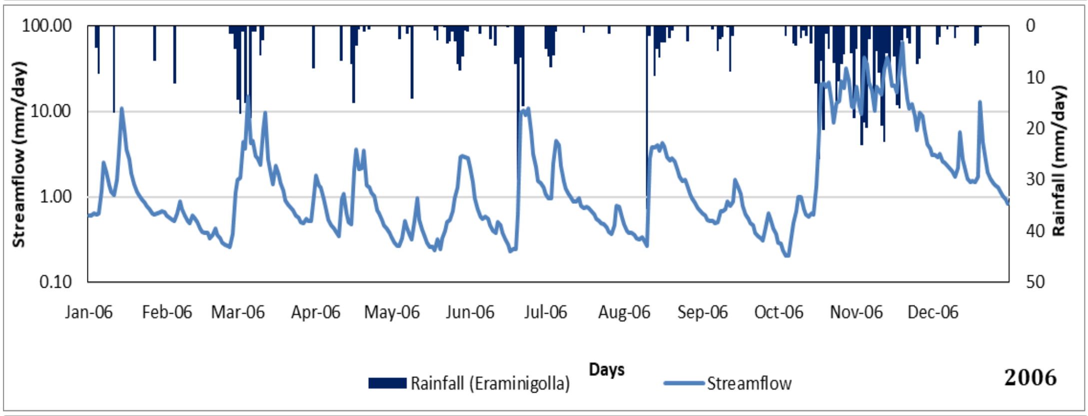
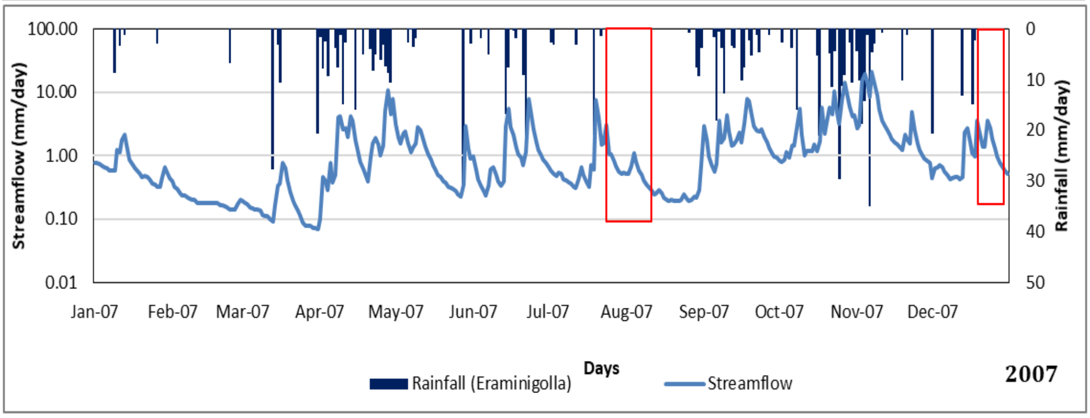
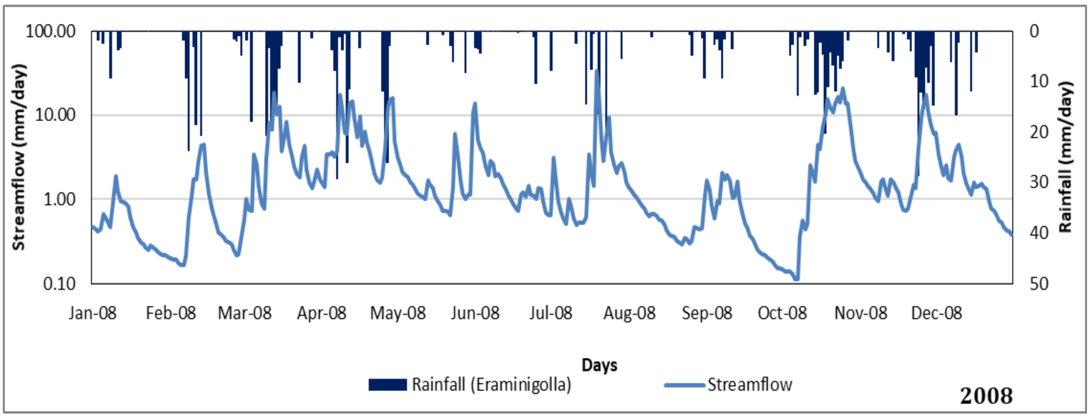
Appendix A: Visual checking of data without filling missing data in calibration and validation period

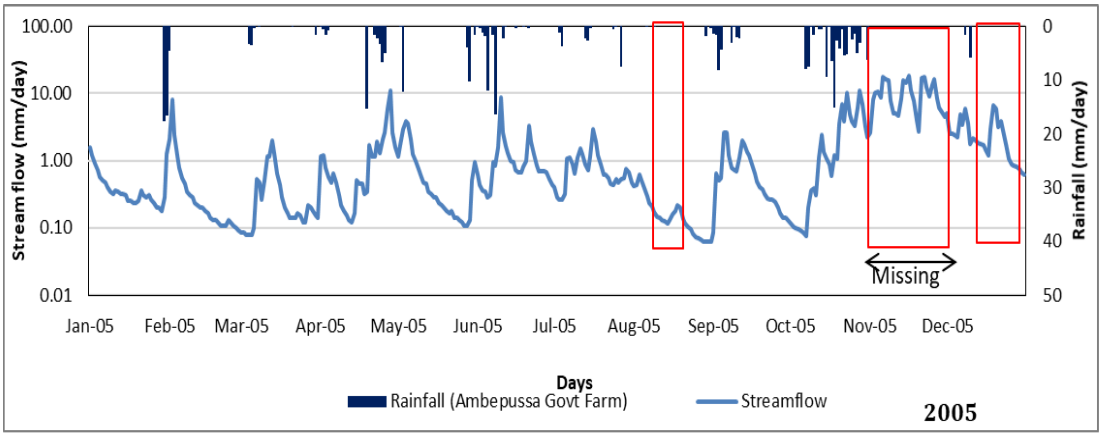
Visual checking without filling missing data in calibration period

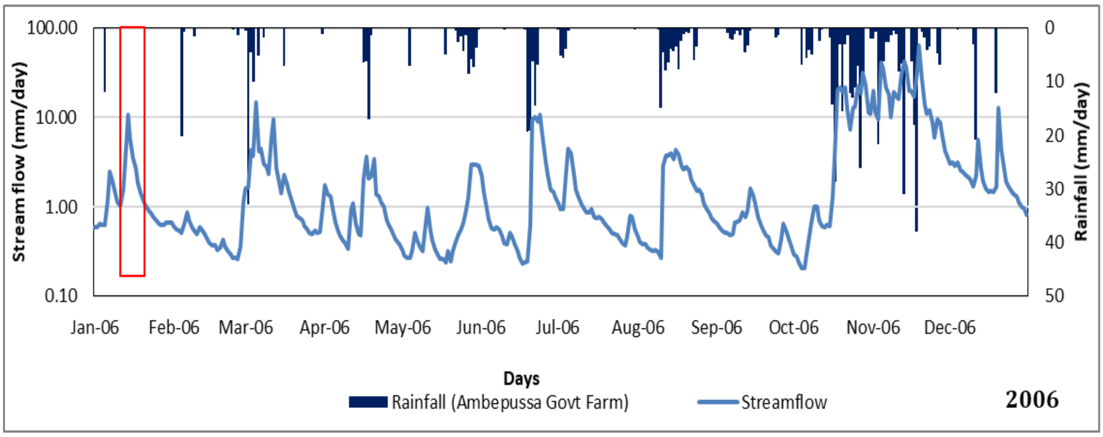









Stream flow (mm/day)
100.00
10.00
1.00
0.10
0.01
Rainfall (mm/day)
0
10
20
30
40
50
Missing
Jan-05
Feb-05
Mar-05
Apr-05
May-05
Jun-05
Jul-05
Aug-05
Sep-05
Oct-05
Nov-05
Dec-05
Days
Rainfall (Ambepussa Govt Farm)
Streamflow
2005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Rainfall (mm/day)
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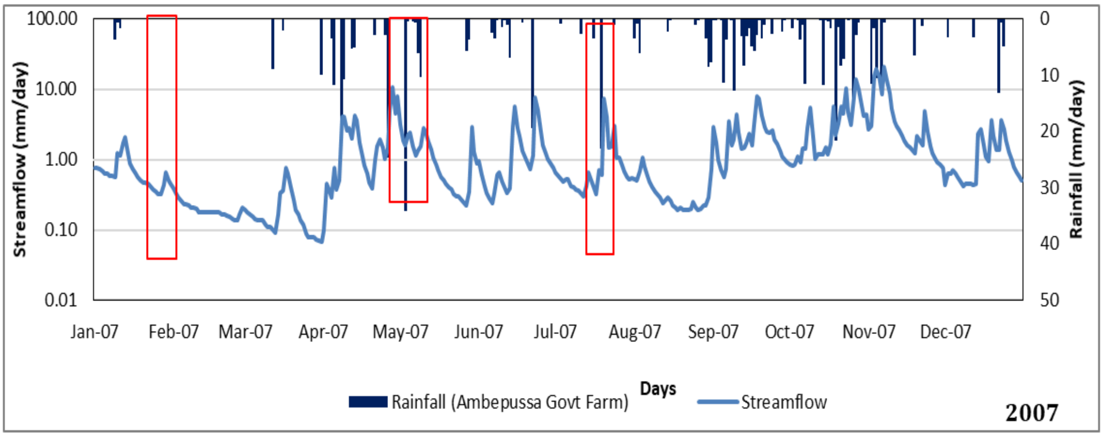
Nov-06
Dec-06
Days
Rainfall (Ambepussa Govt Farm)
Streamflow
2006


Streamflow (mm/day)
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Rainfall (mm/day)
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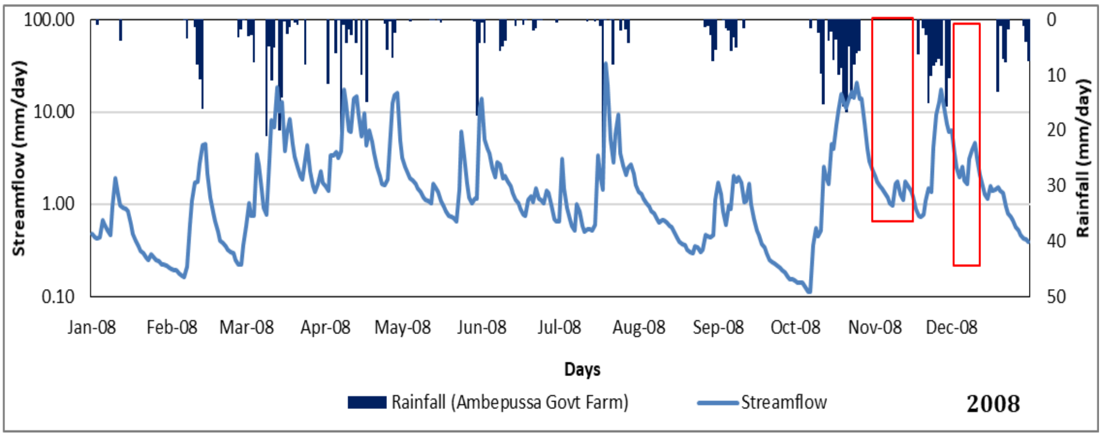
Nov-07
Dec-07
Days
Rainfall (Ambepussa Govt Farm)
Streamflow
2007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Rainfall (mm/day)
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Apr-08
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Sep-08
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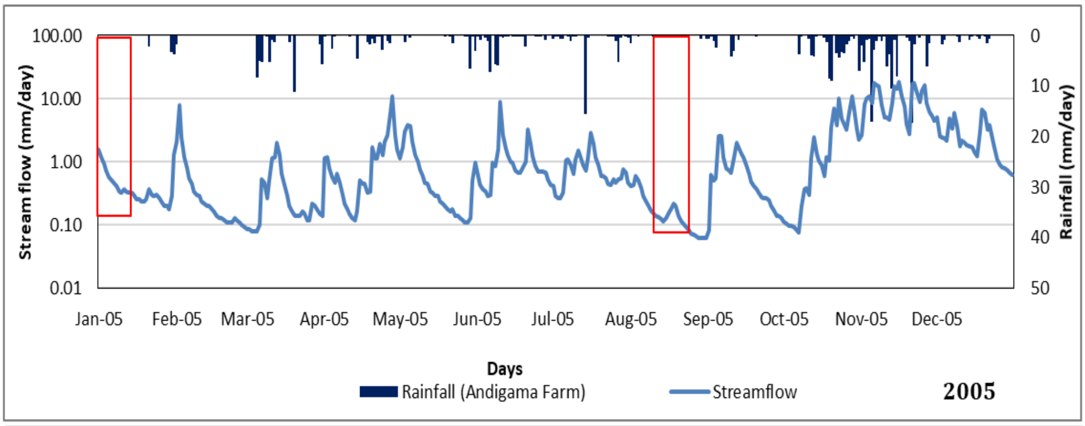
Nov-08
Dec-08
Days
Rainfall (Ambepussa Govt Farm)
Streamflow
2008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Rainfall (mm/day)
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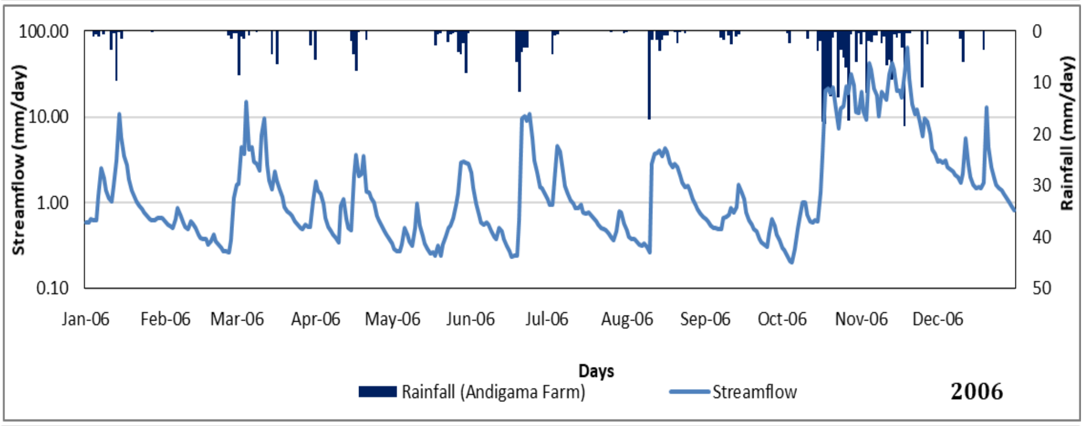
Nov-05
Dec-05
Days
Rainfall (Andigama Farm)
Streamflow
2005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Rainfall (mm/day)
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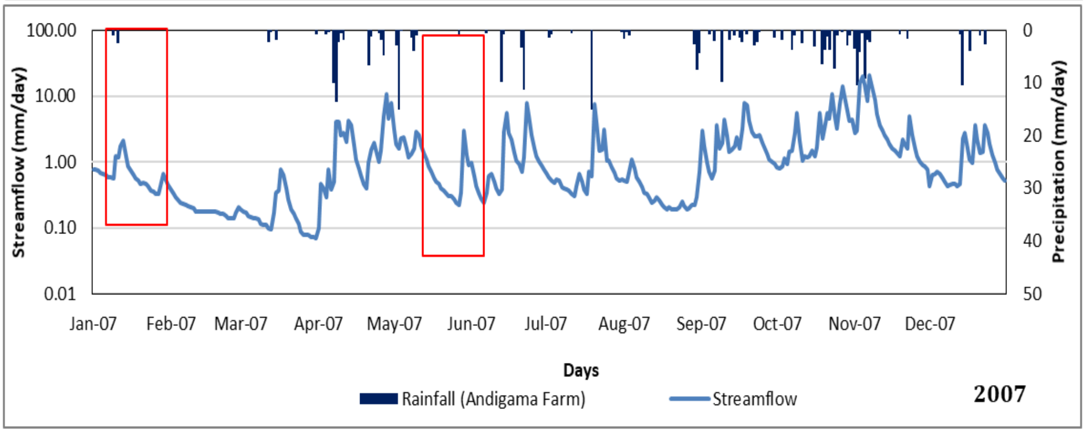
Days
Rainfall (Andigama Farm)
Streamflow
2006


Streamflow (mm/day)
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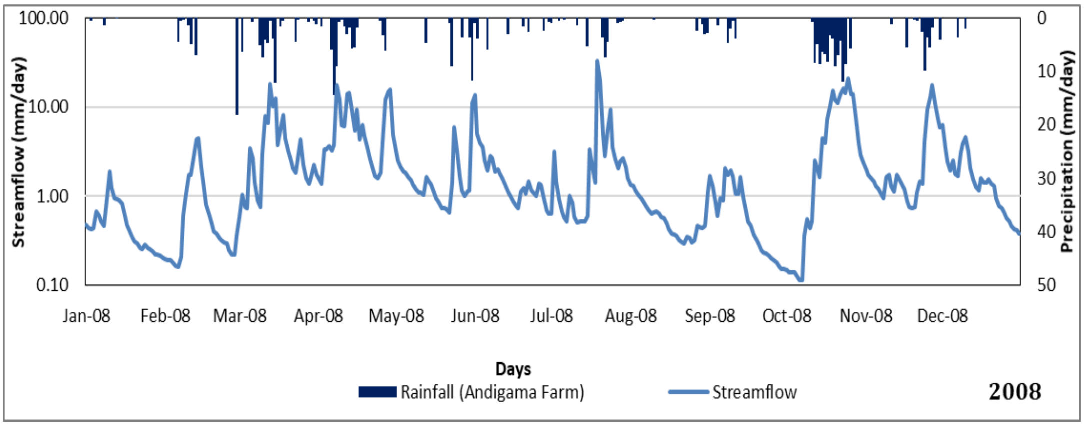
Days
Rainfall (Andigama Farm)
Streamflow
2007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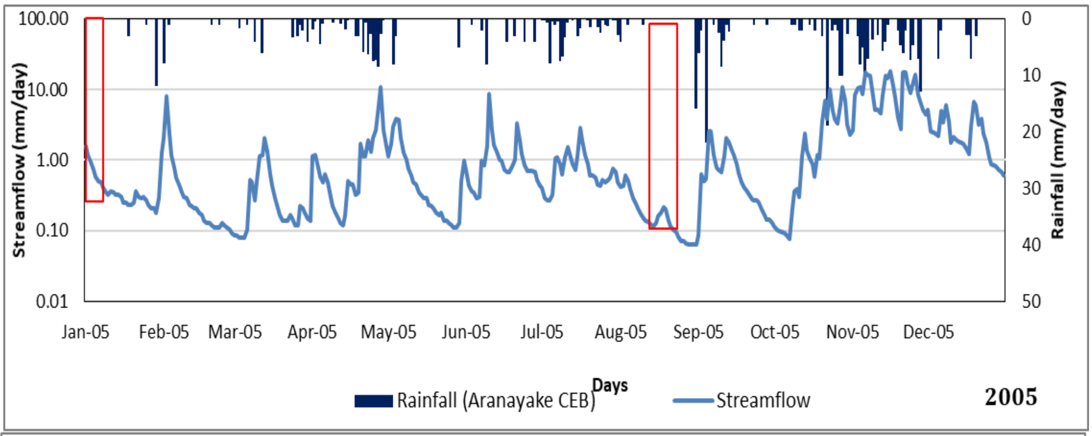
Days
Rainfall (Andigama Farm)
Streamflow
2008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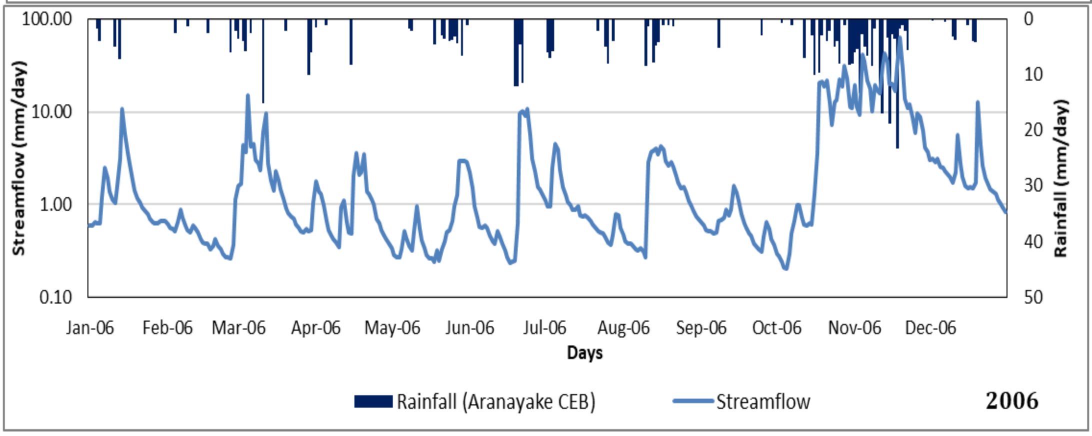
Days
Rainfall (Aranayake CEB)
Streamflow
2005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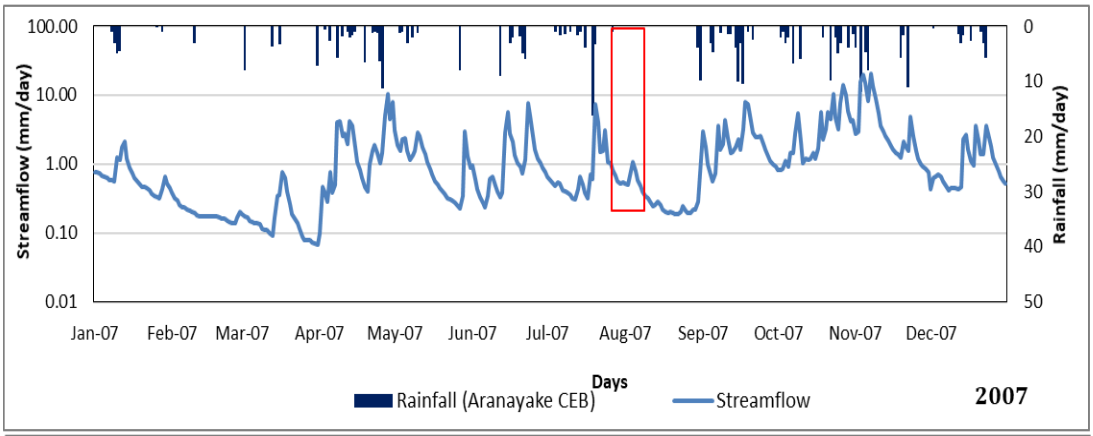
Days
Rainfall (Aranayake CEB)
Streamflow
2006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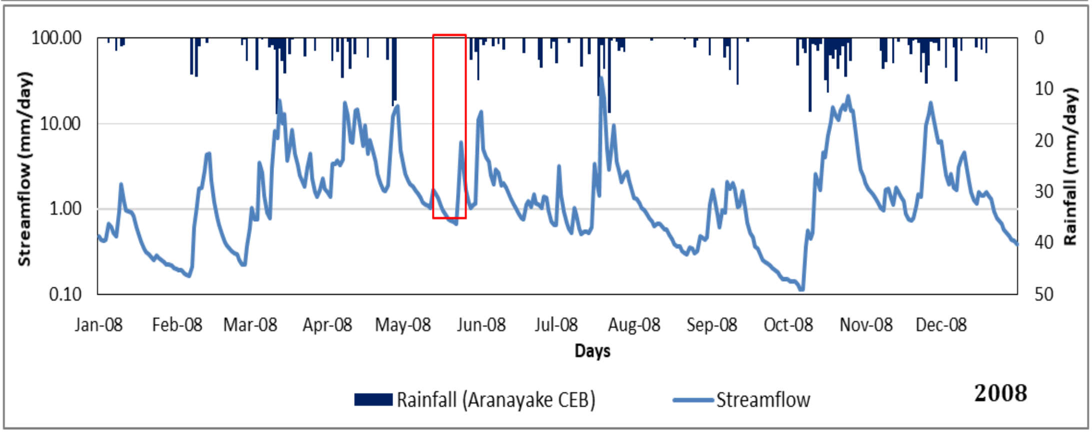
Streamflow
2007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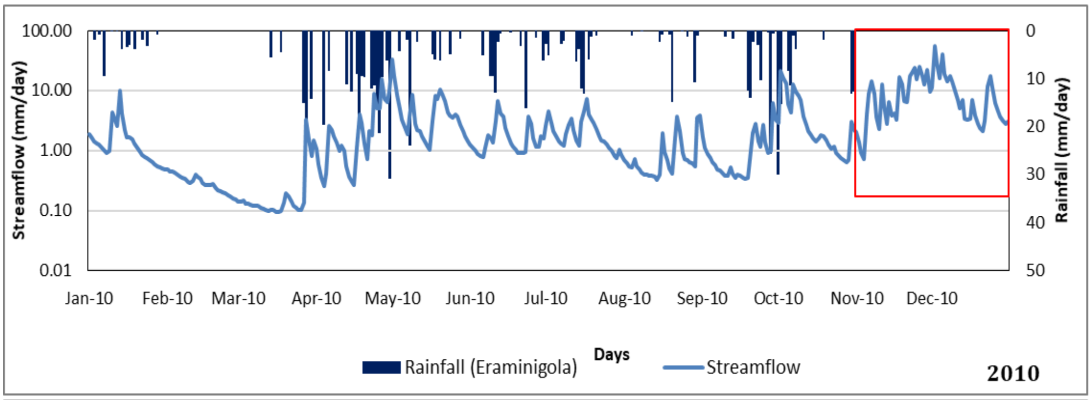
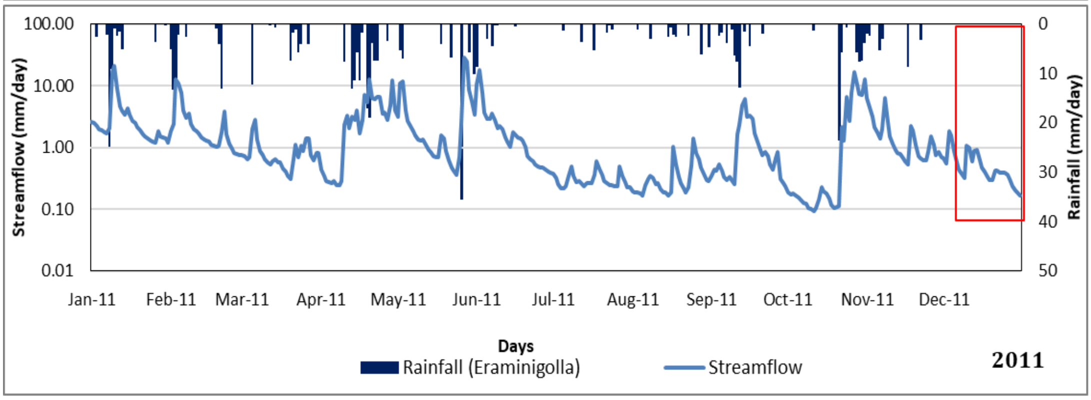
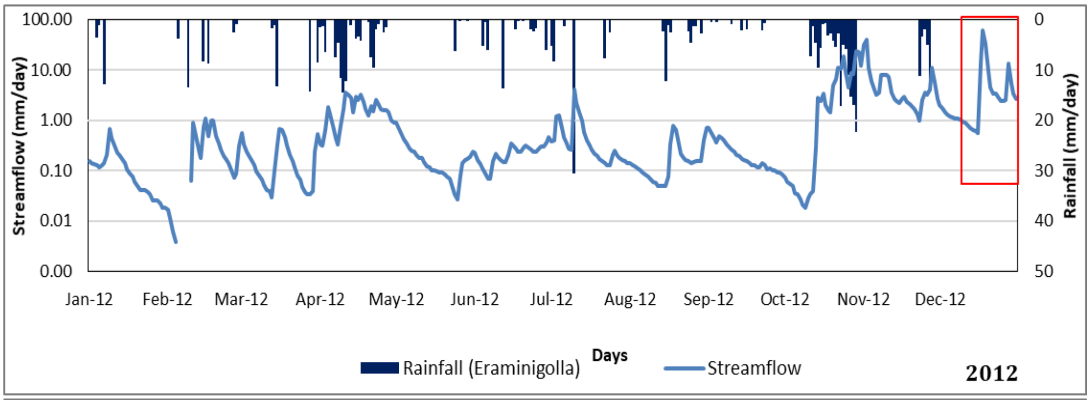
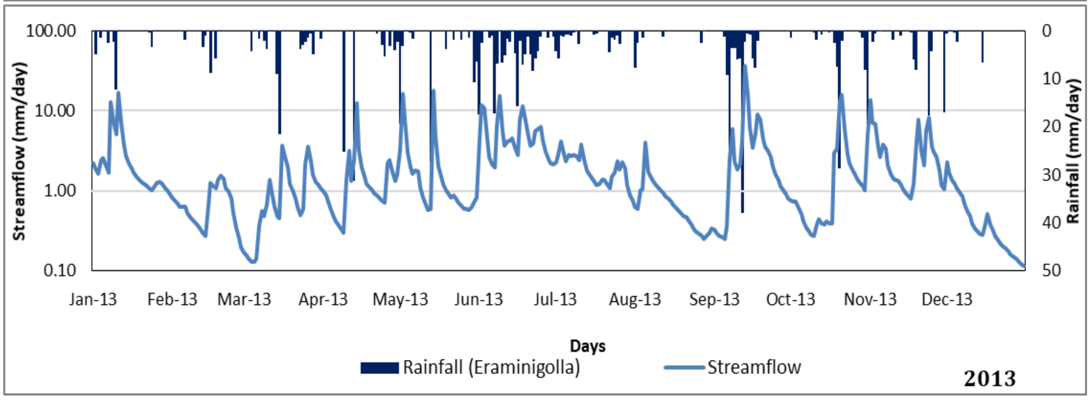
Jan-08 Feb-08 Mar-08 Apr-08 May-08 Jun-08 Jul-08 Aug-08 Sep-08 Oct-08 Nov-08 Dec-08
Days
Rainfall (Aranayake CEB)
Streamflow
2008

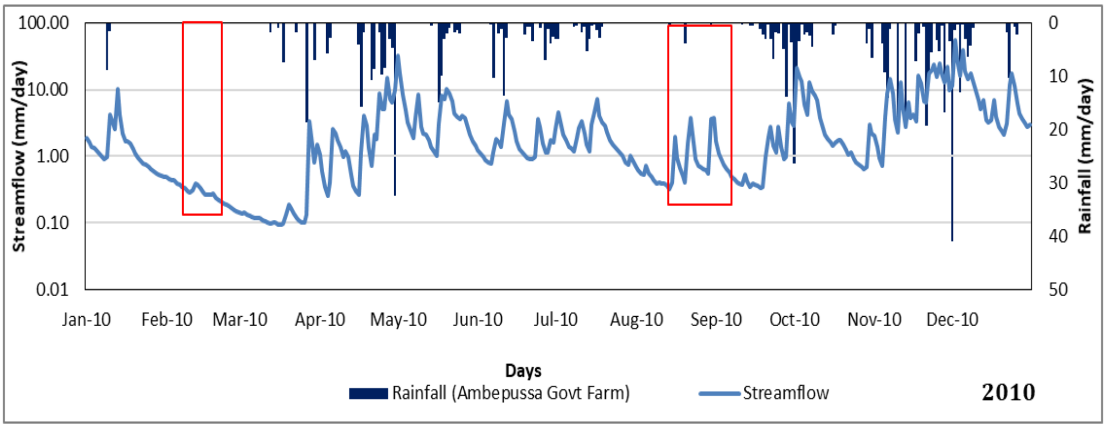
Visual checking without filling missing data in validation period

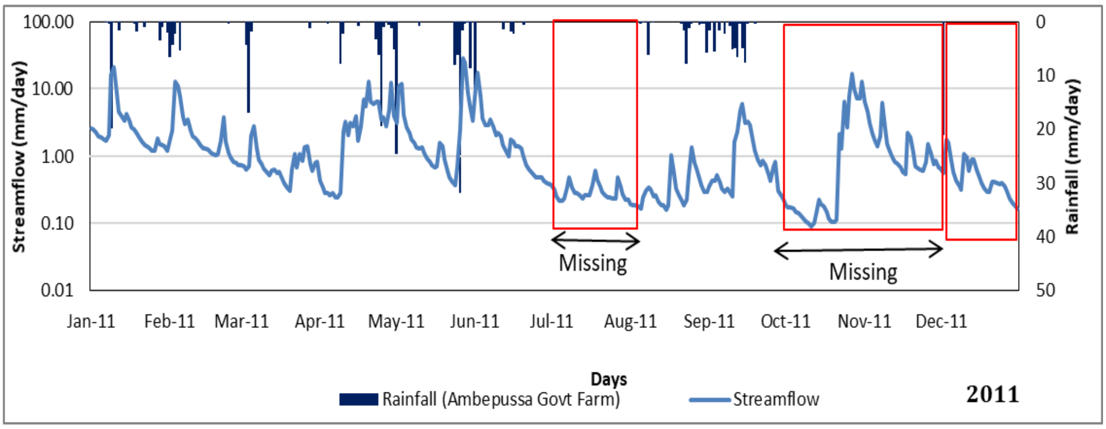


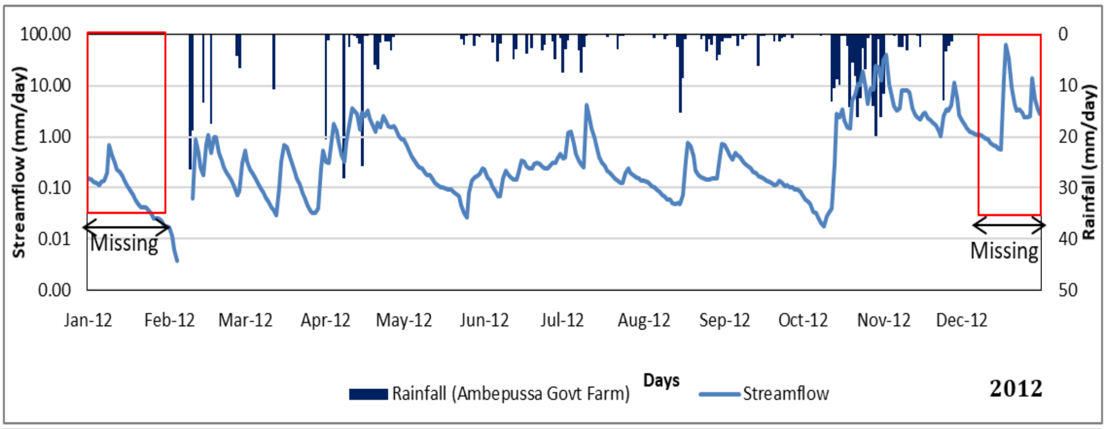


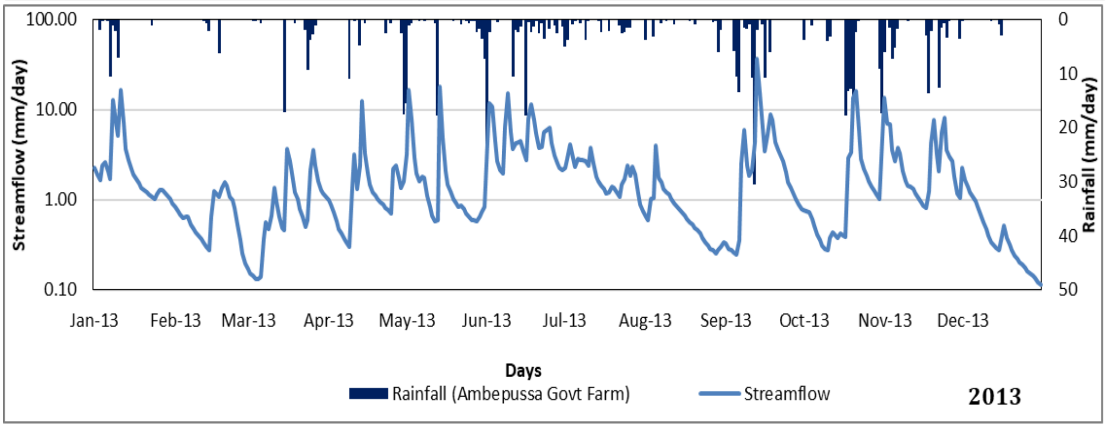


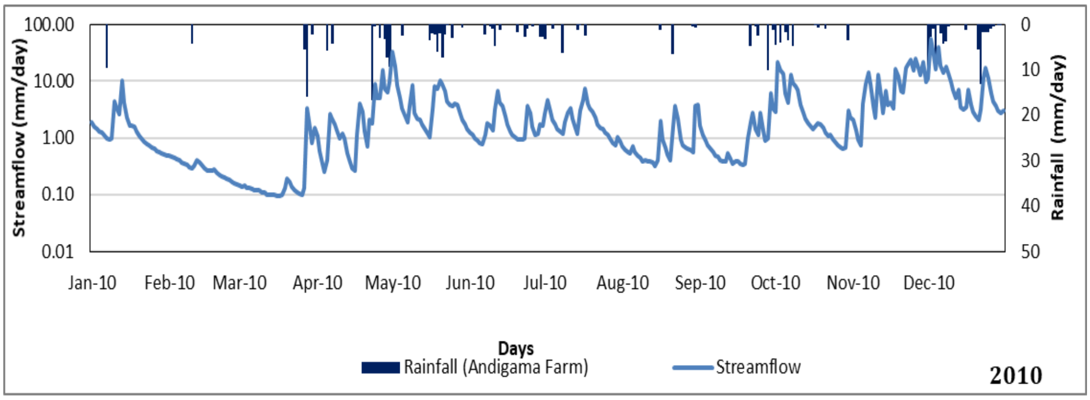


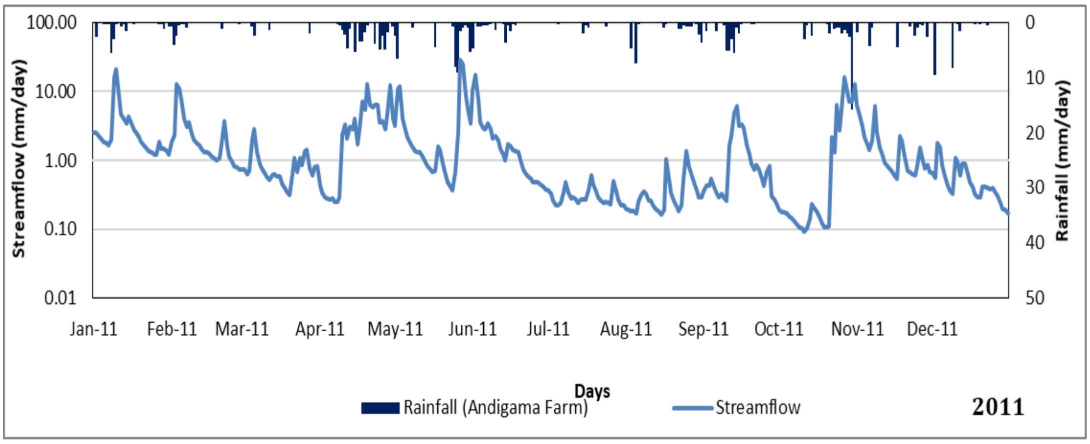

Streamflow (mm/day)
Rainfall (mm/day)
Jan-10 Feb-10 Mar-10 Apr-10 May-10 Jun-10 Jul-10 Aug-10 Sep-10 Oct-10 Nov-10 Dec-10
Days
Rainfall (Ambepussa Govt Farm)
Streamflow
2010

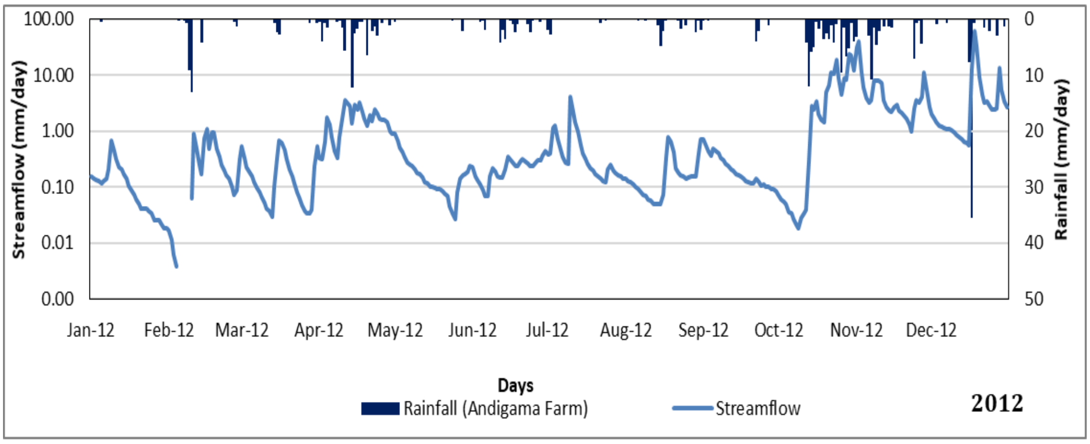

Streamflow (mm/day)
Rainfall (mm/day)
Missing
Missing
Jan-11 Feb-11 Mar-11 Apr-11 May-11 Jun-11 Jul-11 Aug-11 Sep-11 Oct-11 Nov-11 Dec-11
Days
Rainfall (Ambepussa Govt Farm)
Streamflow
2011

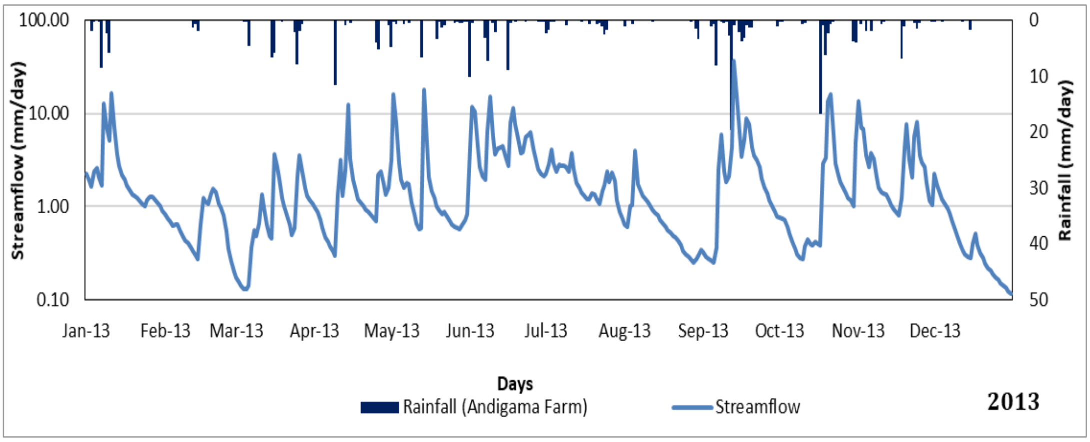

Streamflow (mm/day)
Rainfall (mm/day)
Missing
Missing
Jan-12 Feb-12 Mar-12 Apr-12 May-12 Jun-12 Jul-12 Aug-12 Sep-12 Oct-12 Nov-12 Dec-12
Days
Rainfall (Ambepussa Govt Farm)
Streamflow
2012


Streamflow (mm/day)
Rainfall (mm/day)
Jan-13 Feb-13 Mar-13 Apr-13 May-13 Jun-13 Jul-13 Aug-13 Sep-13 Oct-13 Nov-13 Dec-13
Days
Rainfall (Ambepussa Govt Farm)
Streamflow
2013

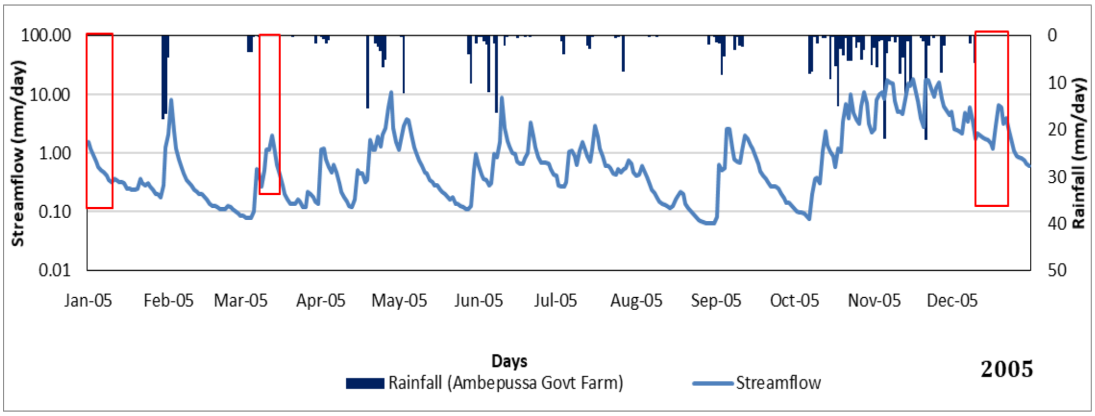

Streamflow (mm/day)
Rainfall (mm/day)
Days
Rainfall (Andigama Farm)
Streamflow
2010

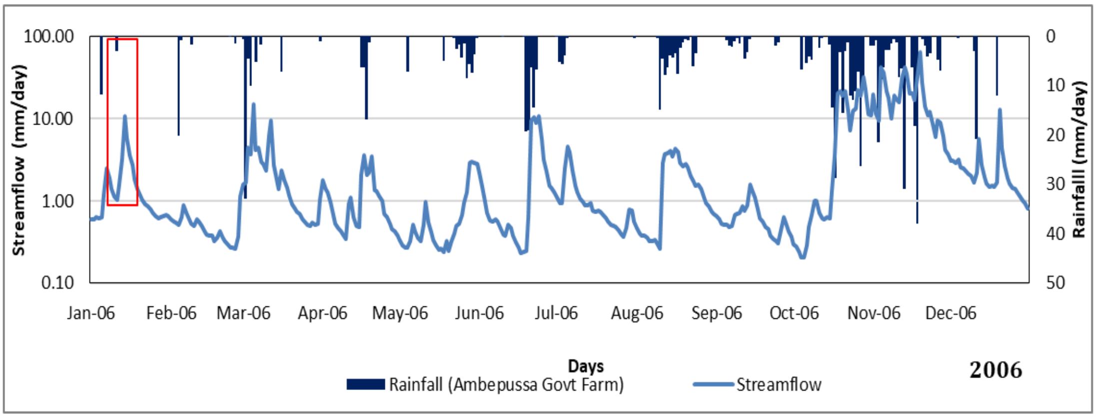

Streamflow (mm/day)
Rainfall (mm/day)
Days
Rainfall (Andigama Farm)
Streamflow
2011

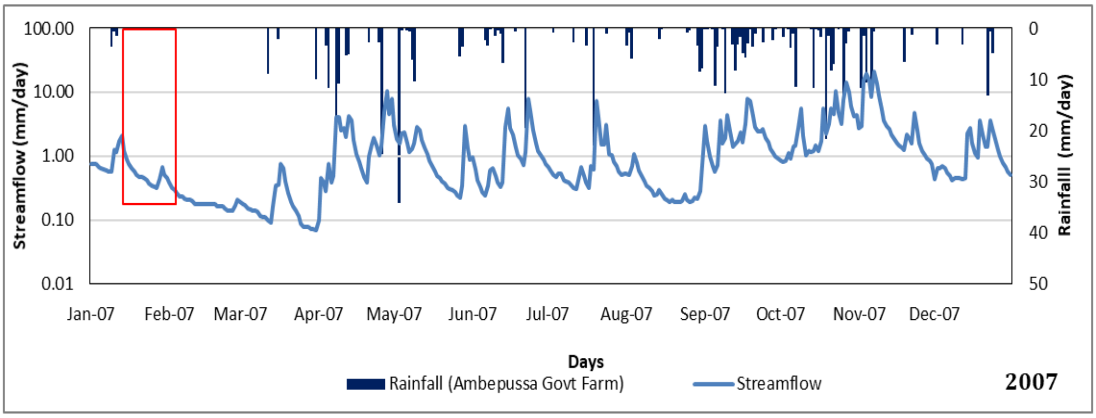

Streamflow (mm/day)
Rainfall (mm/day)
Days
Rainfall (Andigama Farm)
Streamflow
2012

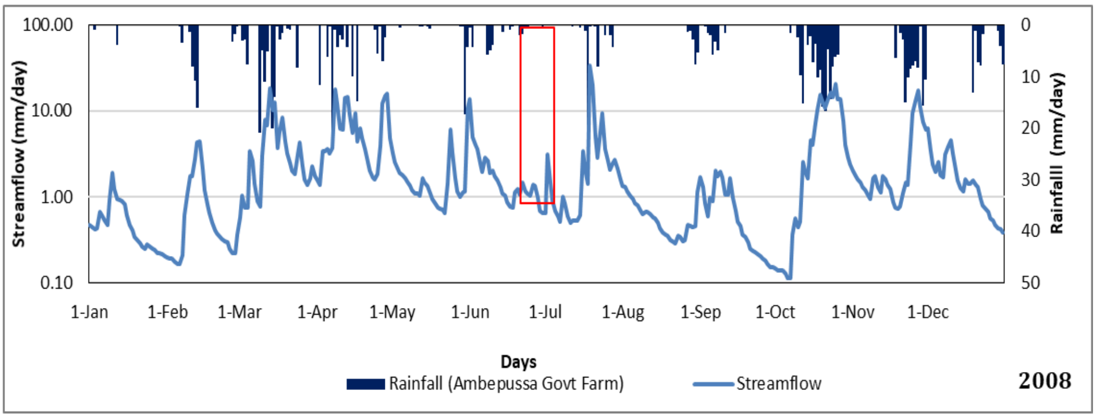

Streamflow (mm/day)
Rainfall (mm/day)
Days
Rainfall (Andigama Farm)
Streamflow
2013

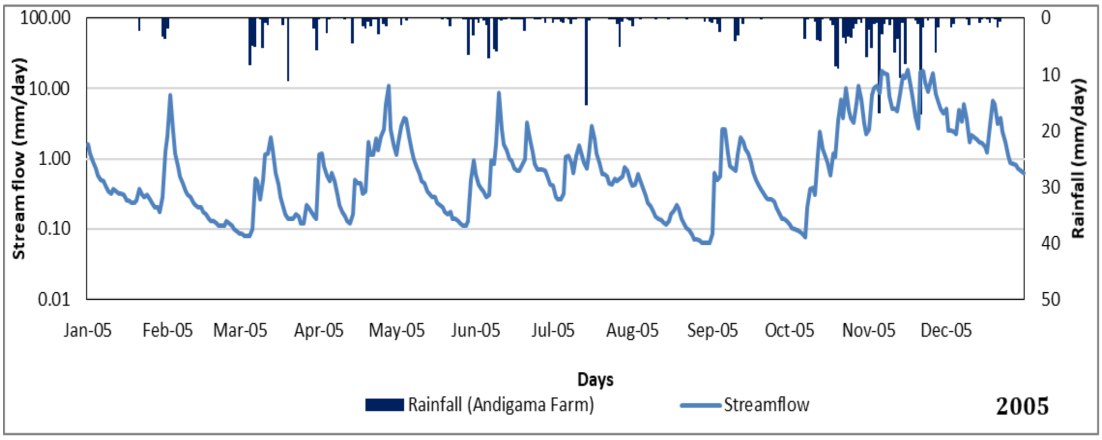
Visual checking with filling missing data for calibration period



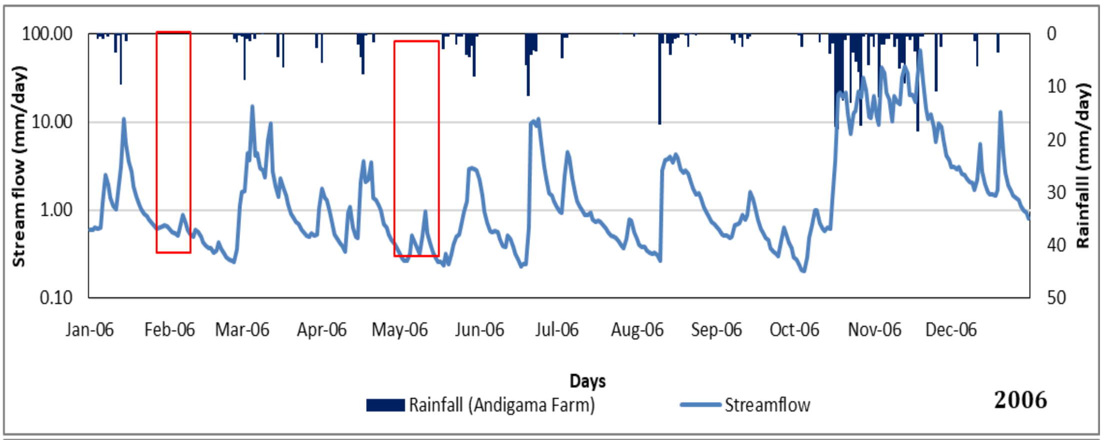




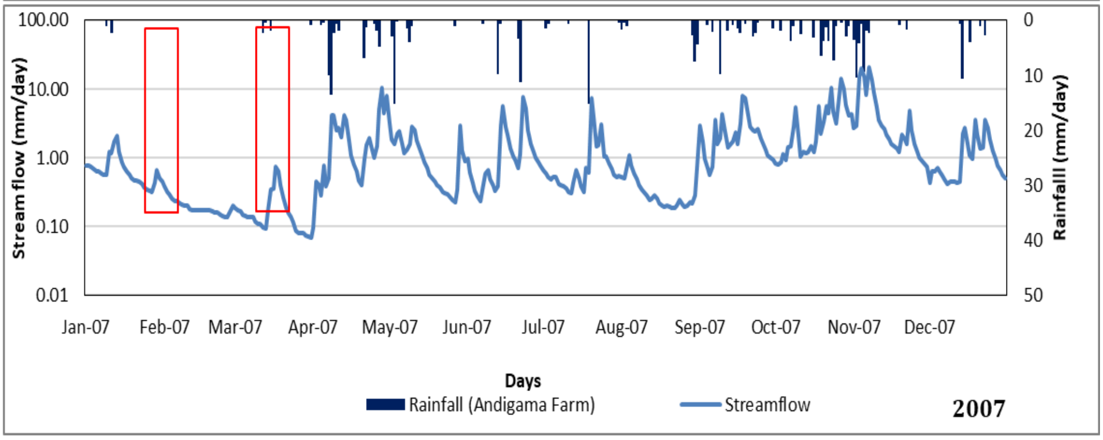




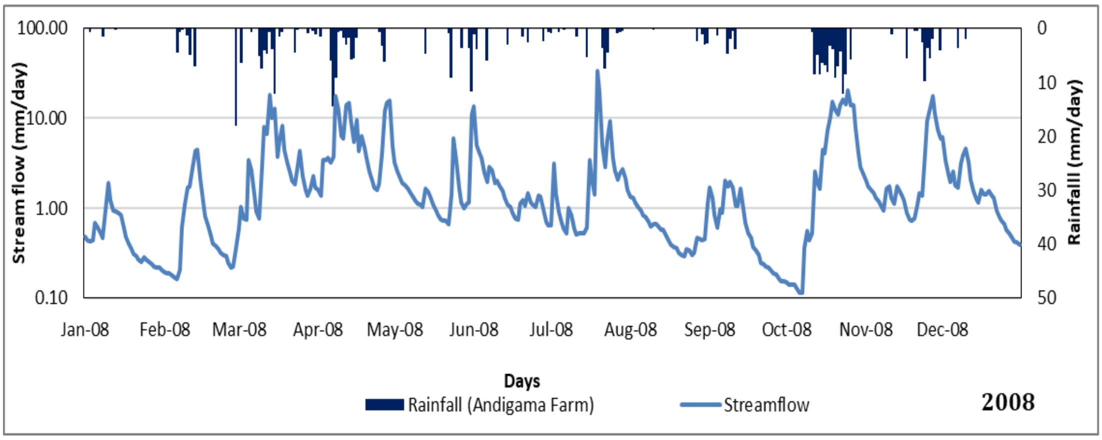
Stream flow (mm/day)
Rainfall (mm/day)
Jan-05 Feb-05 Mar-05 Apr-05 May-05 Jun-05 Jul-05 Aug-05 Sep-05 Oct-05 Nov-05 Dec-05
Days
Rainfall (Andigama Farm)
Streamflow
2005



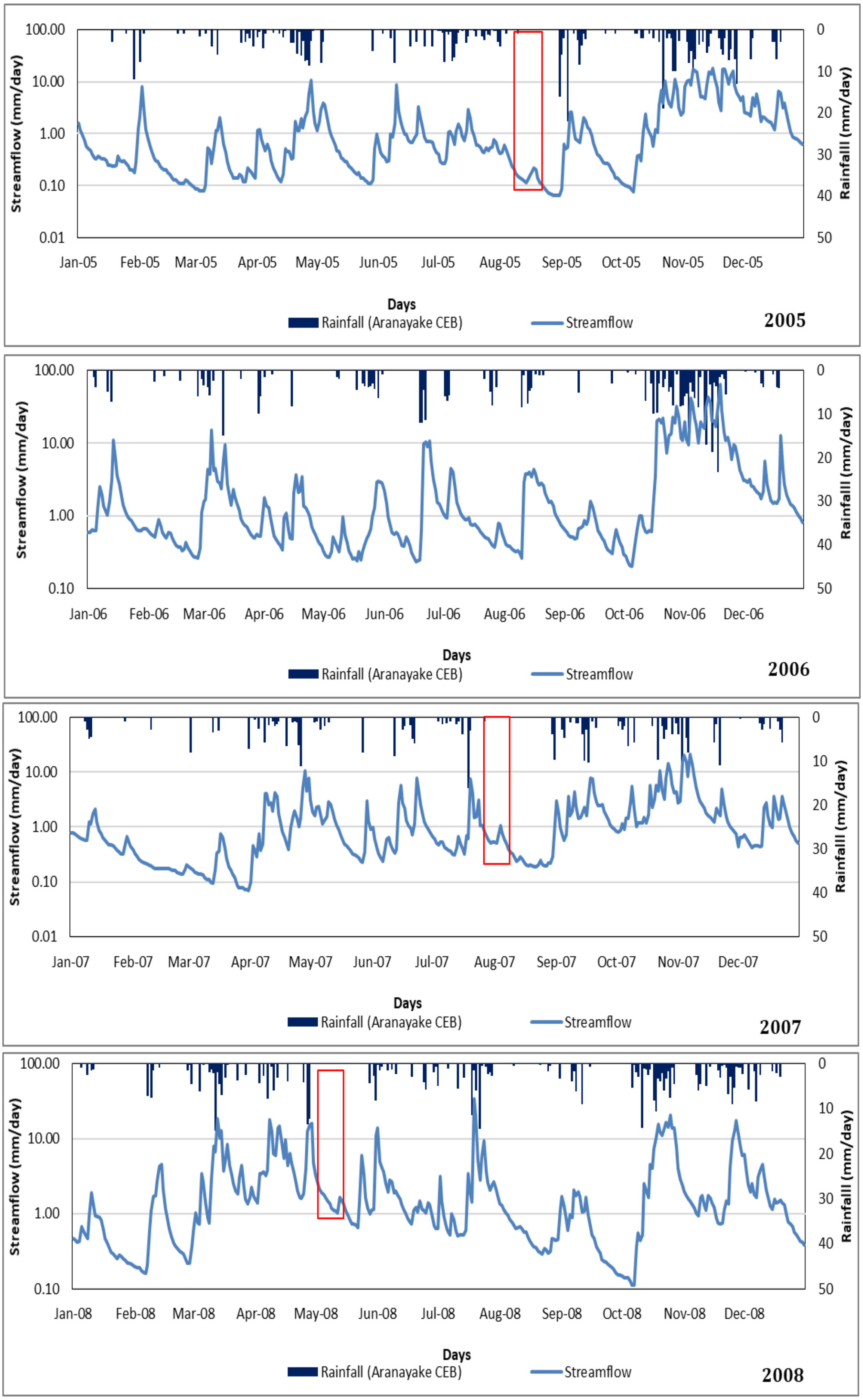
Stream flow (mm/day)
Rainfall (mm/day)
Jan-06 Feb-06 Mar-06 Apr-06 May-06 Jun-06 Jul-06 Aug-06 Sep-06 Oct-06 Nov-06 Dec-06
Days
Rainfall (Andigama Farm)
Streamflow
2006

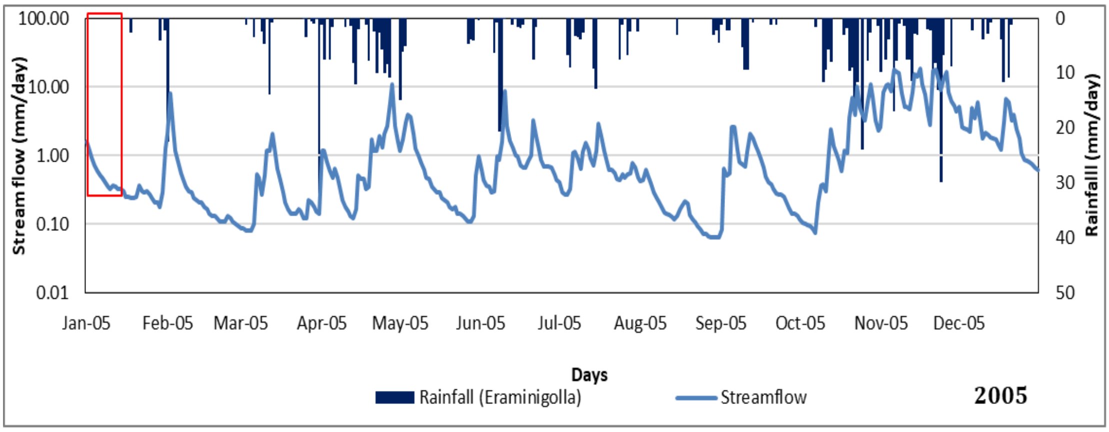


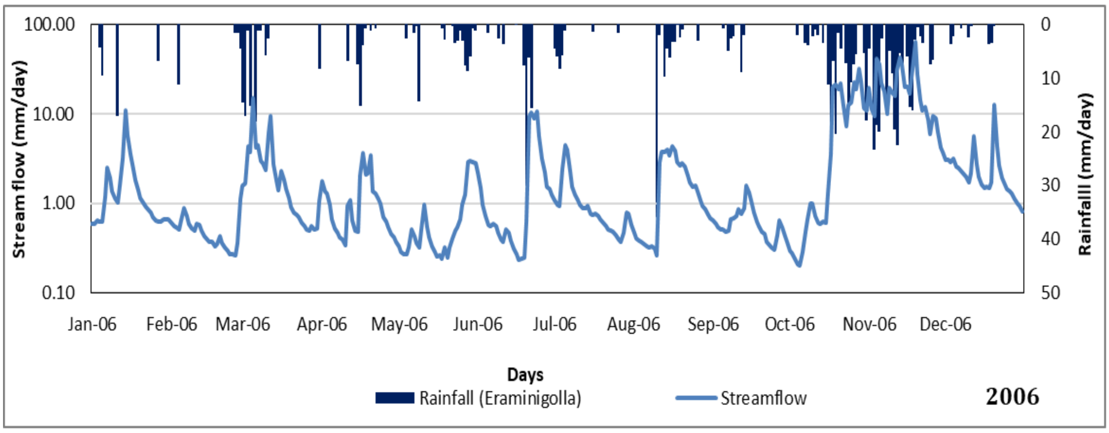
Stream flow (mm/day)
Rainfall (mm/day)
Jan-07 Feb-07 Mar-07 Apr-07 May-07 Jun-07 Jul-07 Aug-07 Sep-07 Oct-07 Nov-07 Dec-07
Days
Rainfall (Andigama Farm)
Streamflow
2007

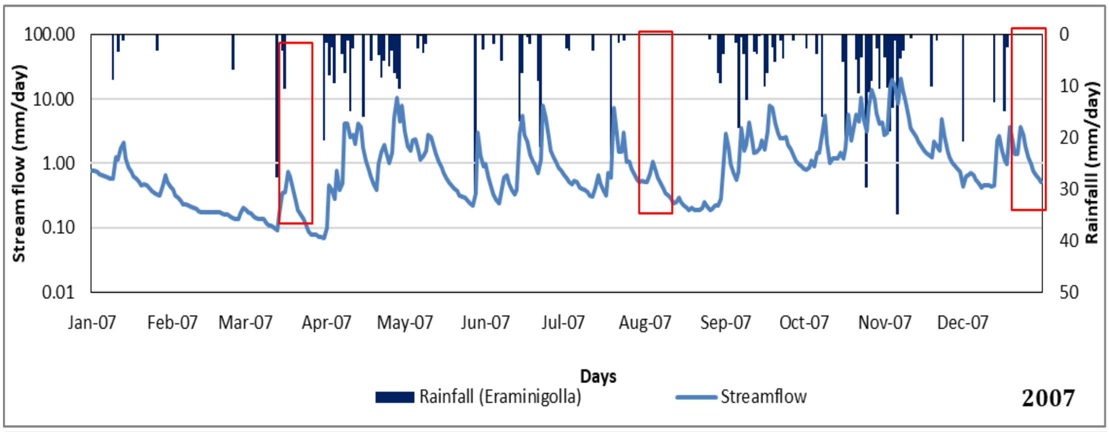


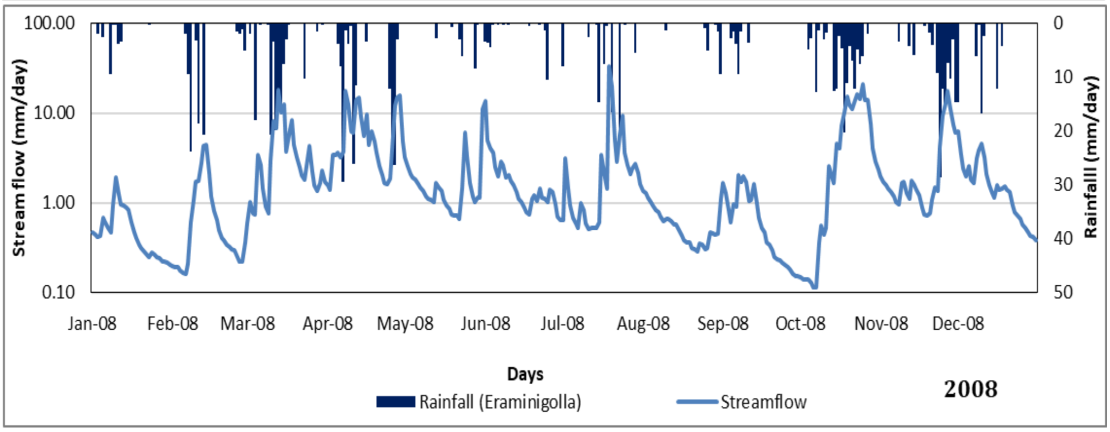
Stream flow (mm/day)
Rainfall (mm/day)
Jan-08 Feb-08 Mar-08 Apr-08 May-08 Jun-08 Jul-08 Aug-08 Sep-08 Oct-08 Nov-08 Dec-08
Days
Rainfall (Andigama Farm)
Streamflow
2008


Streamflow (mm/day)
Rainfalll (mm/day)
Days
Rainfall (Aranayake CEB)
Streamflow
2005
Jan-05
Feb-05
Mar-05
Apr-05
May-05
Jun-05
Jul-05
Aug-05
Sep-05
Oct-05
Nov-05
Dec-05
2006
Jan-06
Feb-06
Mar-06
Apr-06
May-06
Jun-06
Jul-06
Aug-06
Sep-06
Oct-06
Nov-06
Dec-06
2007
Jan-07
Feb-07
Mar-07
Apr-07
May-07
Jun-07
Jul-07
Aug-07
Sep-07
Oct-07
Nov-07
Dec-07
2008
Jan-08
Feb-08
Mar-08
Apr-08
May-08
Jun-08
Jul-08
Aug-08
Sep-08
Oct-08
Nov-08
Dec-08

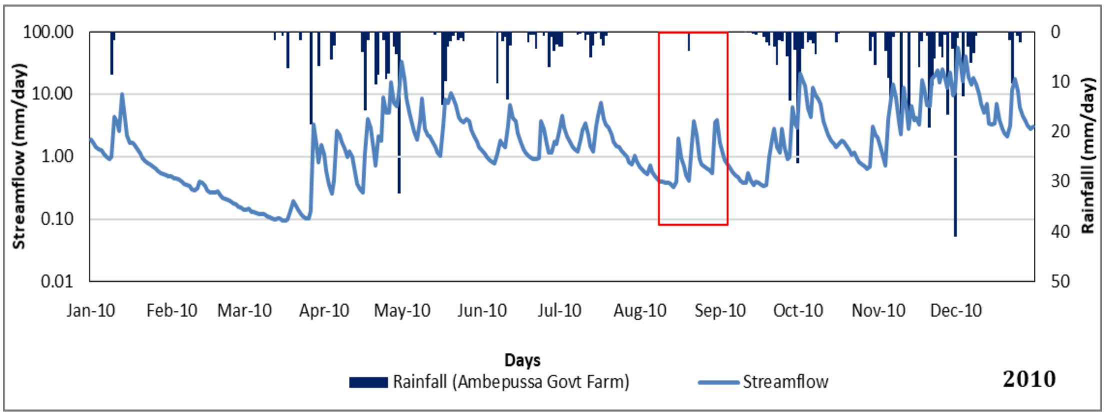

100.00
10.00
1.00
0.10
0.01
Stream flow (mm/day)
0
10
20
30
40
50
Rainfalll (mm/day)
Jan-05
Feb-05
Mar-05
Apr-05
May-05
Jun-05
Jul-05
Aug-05
Sep-05
Oct-05
Nov-05
Dec-05
Days
Rainfall (Eraminigolla)
Streamflow
2005

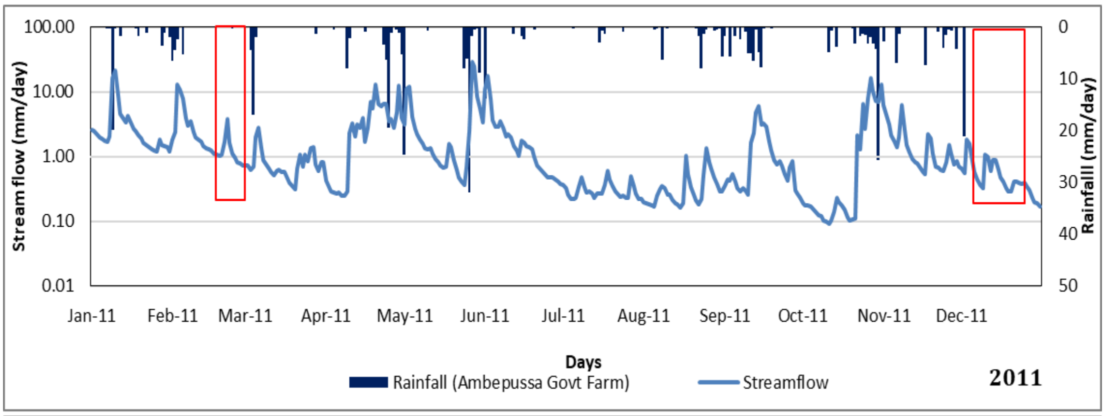

100.00
10.00
1.00
0.10
Stream flow (mm/day)
0
10
20
30
40
50
Rainfalll (mm/day)
Jan-06
Feb-06
Mar-06
Apr-06
May-06
Jun-06
Jul-06
Aug-06
Sep-06
Oct-06
Nov-06
Dec-06
Days
Rainfall (Eraminigolla)
Streamflow
2006

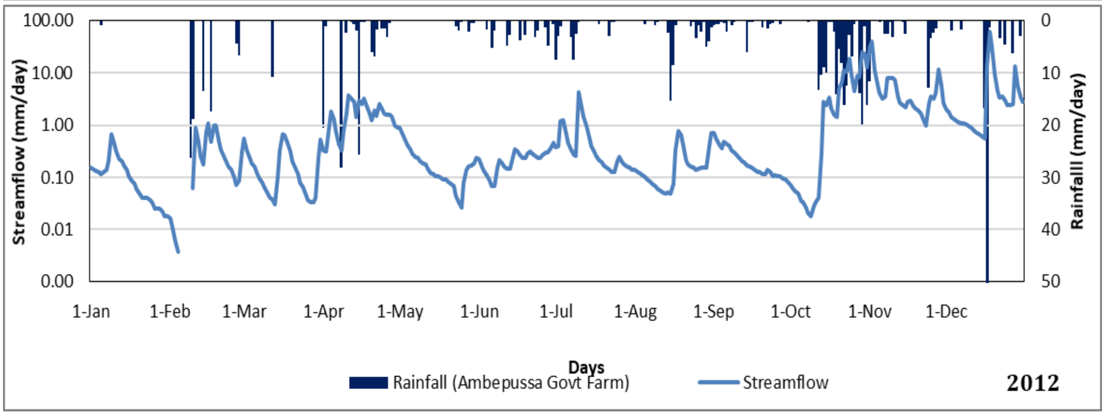

100.00
10.00
1.00
0.10
0.01
Stream flow (mm/day)
0
10
20
30
40
50
Rainfalll (mm/day)
Jan-07
Feb-07
Mar-07
Apr-07
May-07
Jun-07
Jul-07
Aug-07
Sep-07
Oct-07
Nov-07
Dec-07
Days
Rainfall (Eraminigolla)
Streamflow
2007

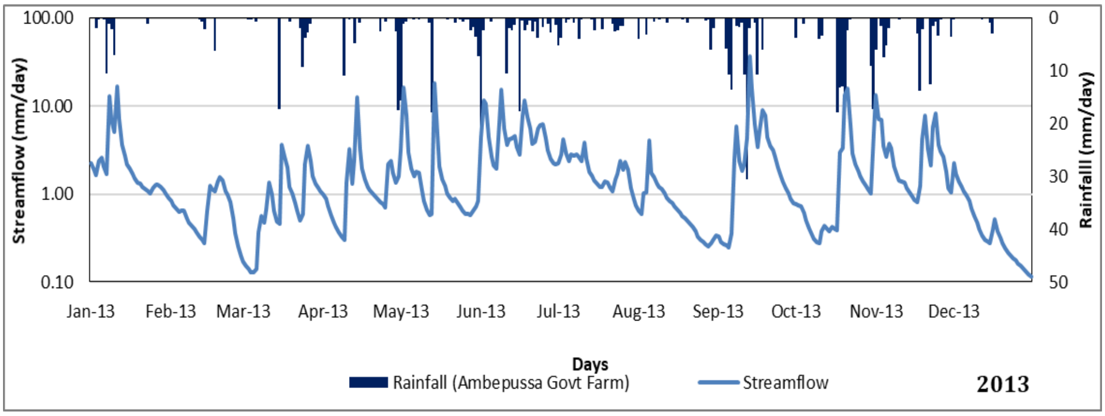

100.00
10.00
1.00
0.10
Stream flow (mm/day)
0
10
20
30
40
50
Rainfalll (mm/day)
Jan-08
Feb-08
Mar-08
Apr-08
May-08
Jun-08
Jul-08
Aug-08
Sep-08
Oct-08
Nov-08
Dec-08
Days
Rainfall (Eraminigolla)
Streamflow
2008

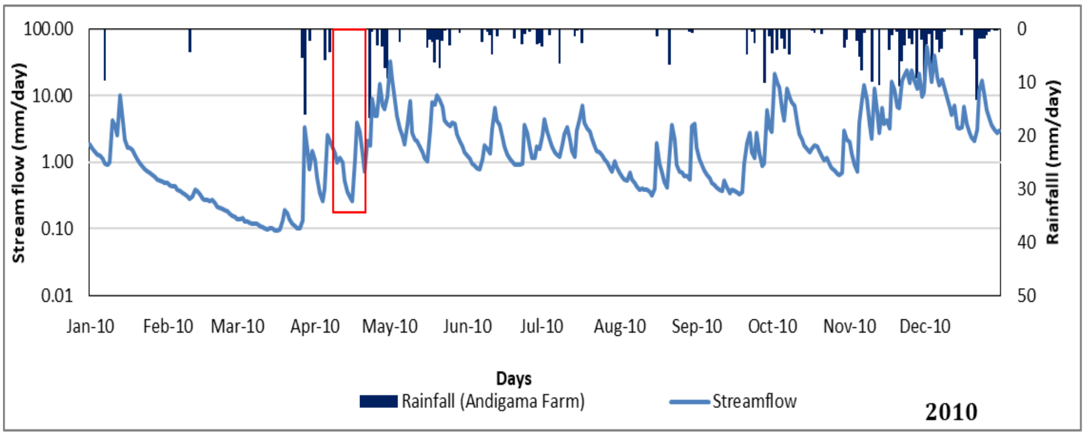
Visual checking with filling missing data in validation period

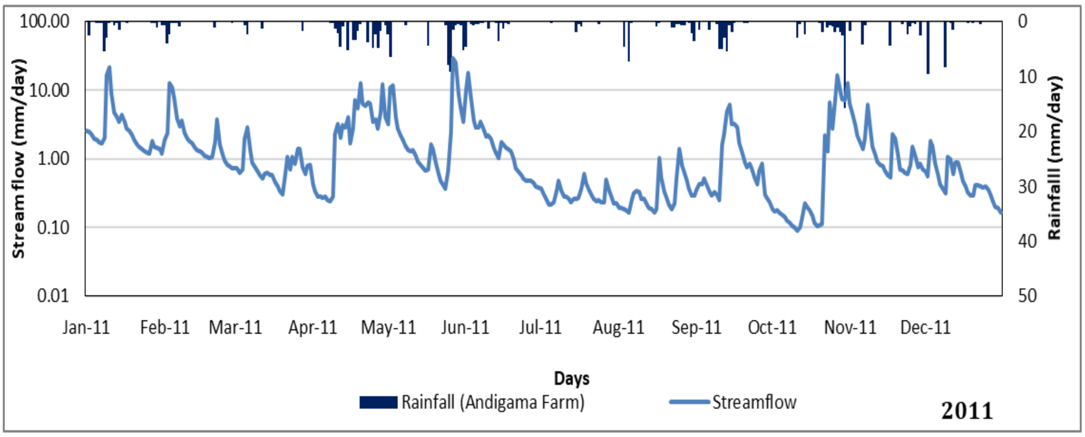


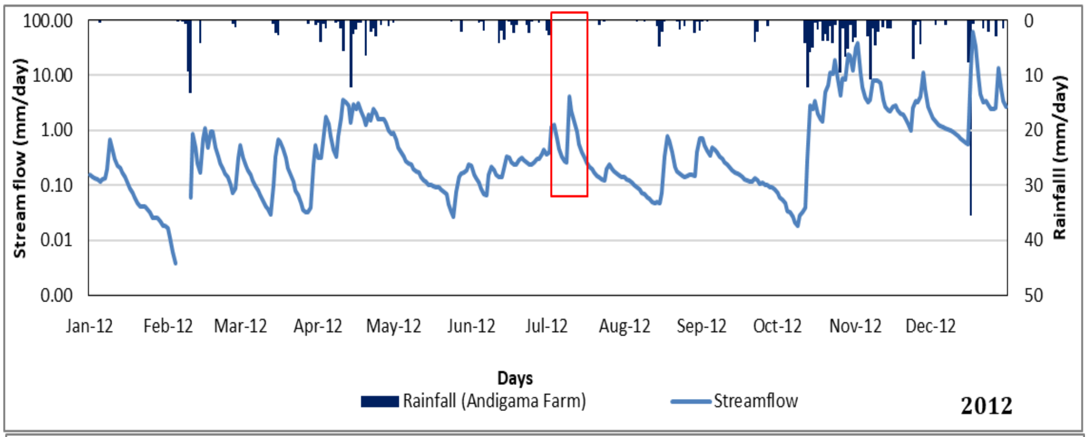


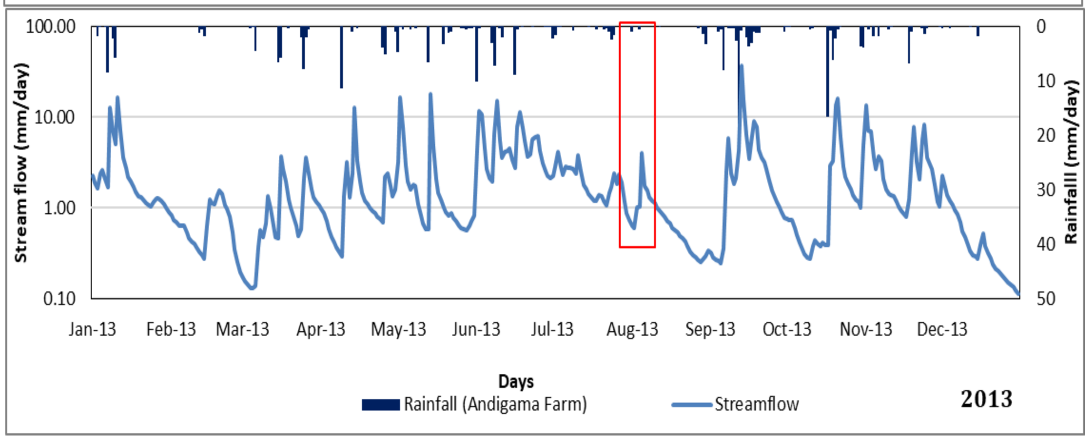


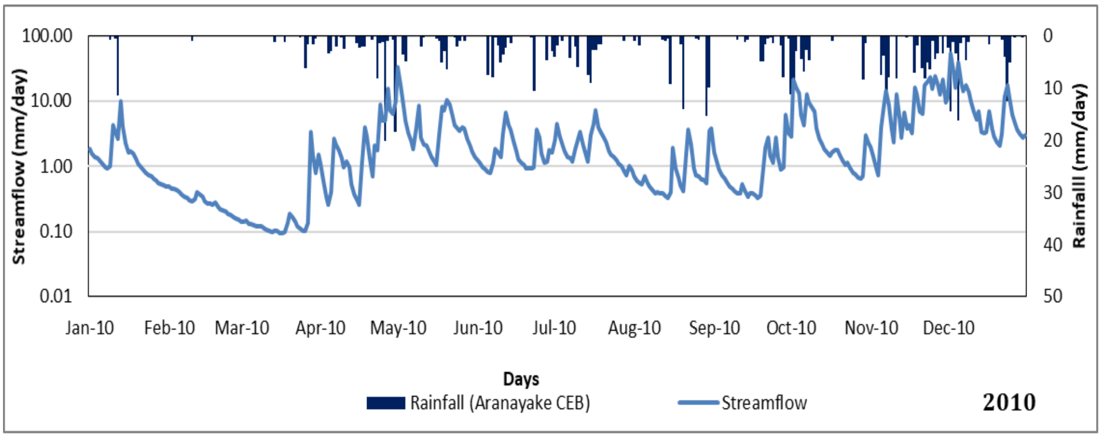


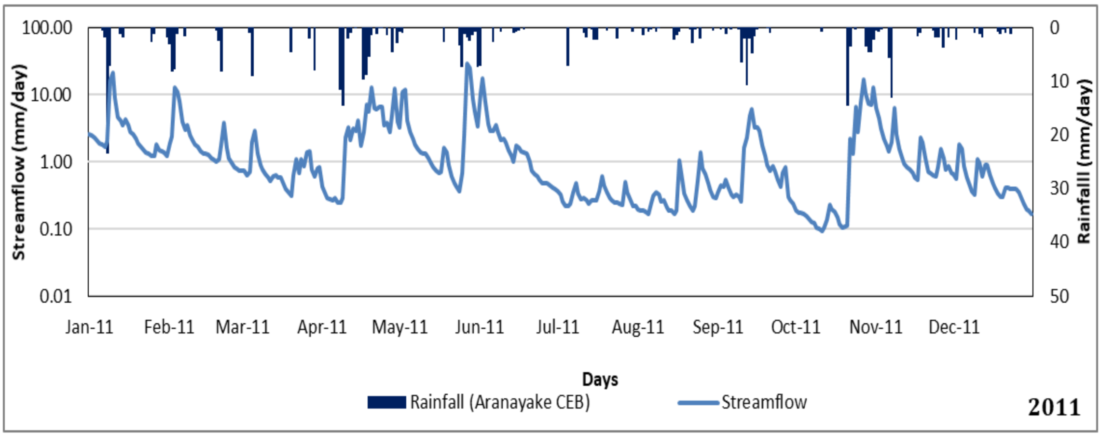

Stream flow (mm/day)
Rainfalll (mm/day)
Days
Rainfall (Andigama Farm)
Streamflow
2010

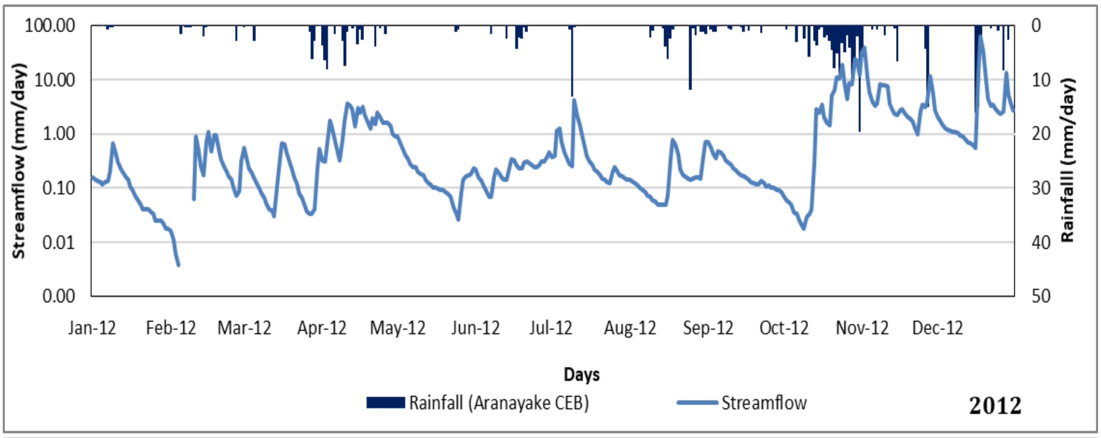

Stream flow (mm/day)
Rainfalll (mm/day)
Days
Rainfall (Andigama Farm)
Streamflow
2011

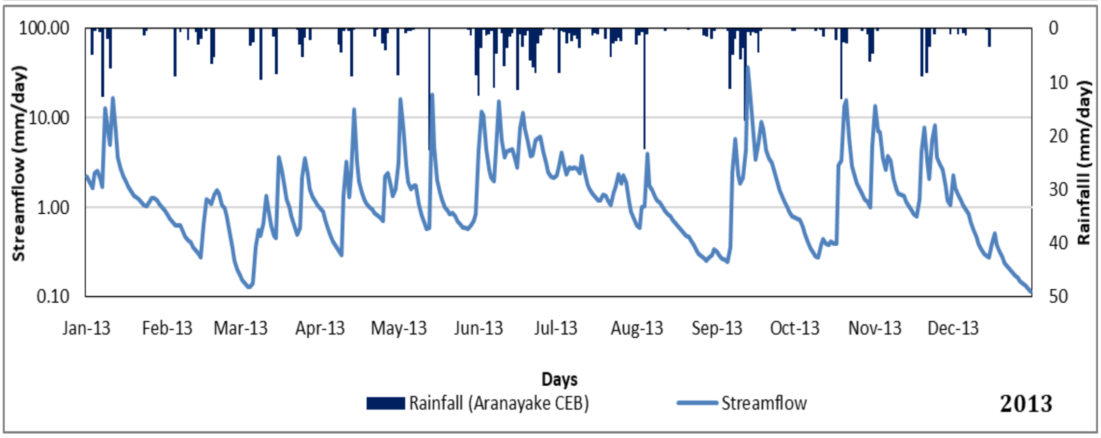

Stream flow (mm/day)
Rainfalll (mm/day)
Days
Rainfall (Andigama Farm)
Streamflow
2012

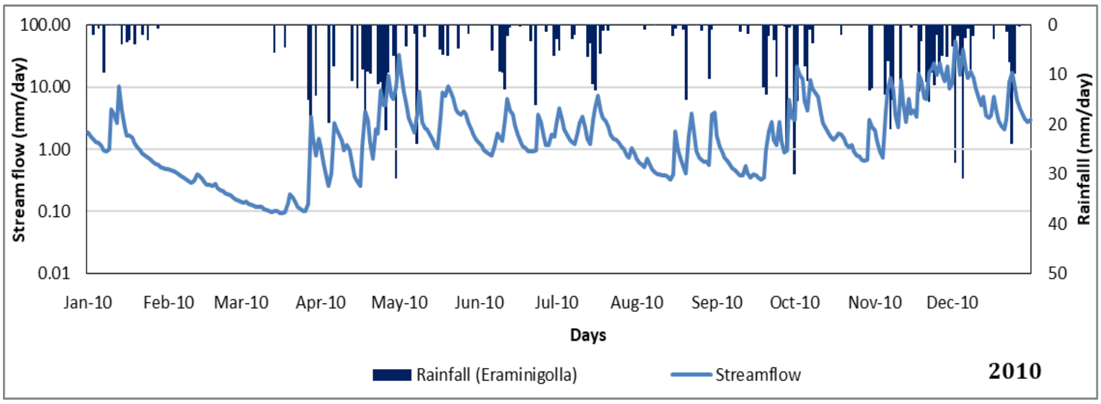

Stream flow (mm/day)
Rainfalll (mm/day)
Days
Rainfall (Andigama Farm)
Streamflow
2013

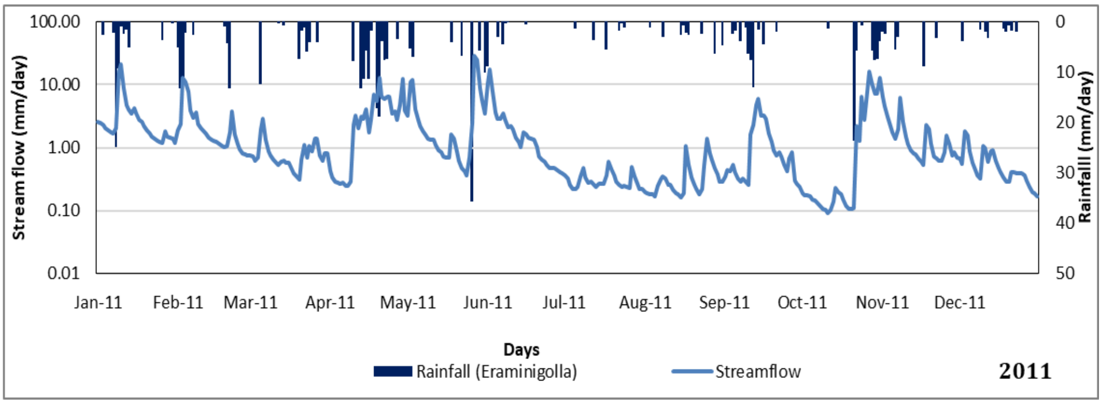

Streamflow (mm/day)
Rainfalll (mm/day)
Days
Rainfall (Aranayake CEB)
Streamflow
2010

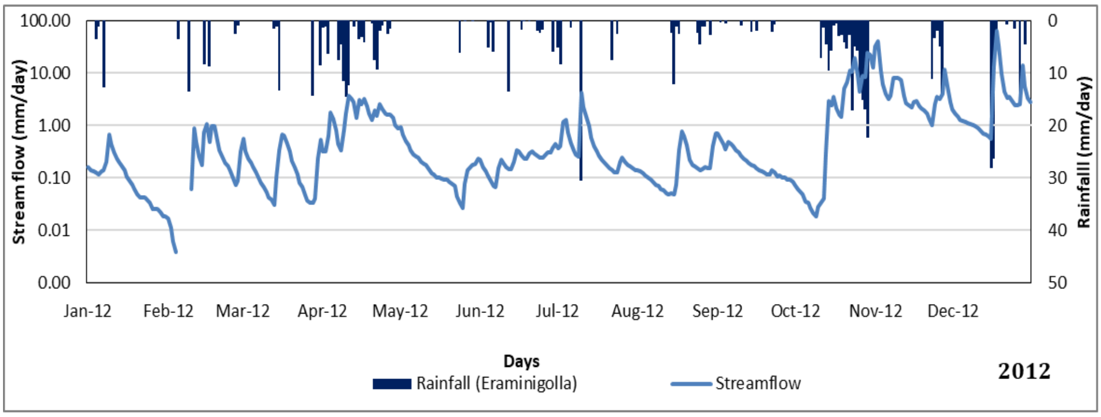

Streamflow (mm/day)
Rainfall (mm/day)
Days
Rainfall (Aranayake CEB)
Streamflow
2011

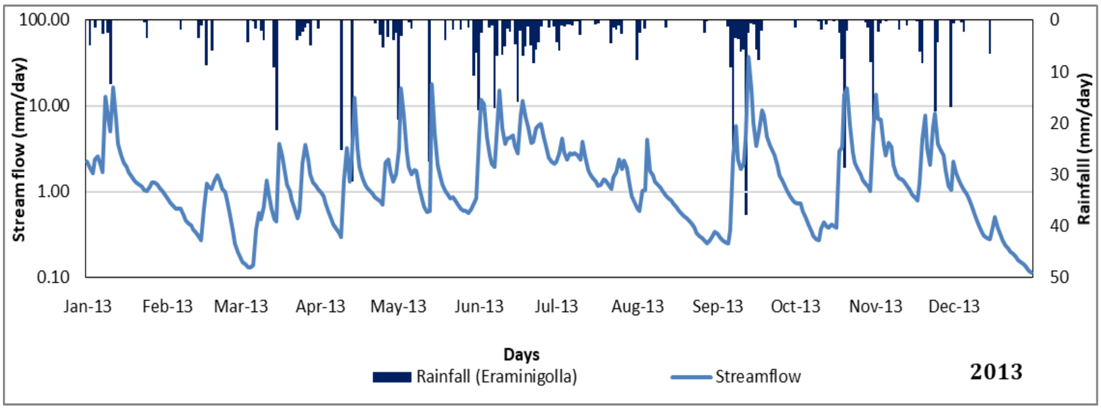

Streamflow (mm/day)
Rainfall (mm/day)
Days
Rainfall (Aranayake CEB)
Streamflow
2012


Streamflow (mm/day)
Rainfall (mm/day)
Days
Rainfall (Aranayake CEB)
Streamflow
2013


Stream flow (mm/day)
Rainfall (mm/day)
Days
Rainfall (Eraminigolla)
Streamflow
2010

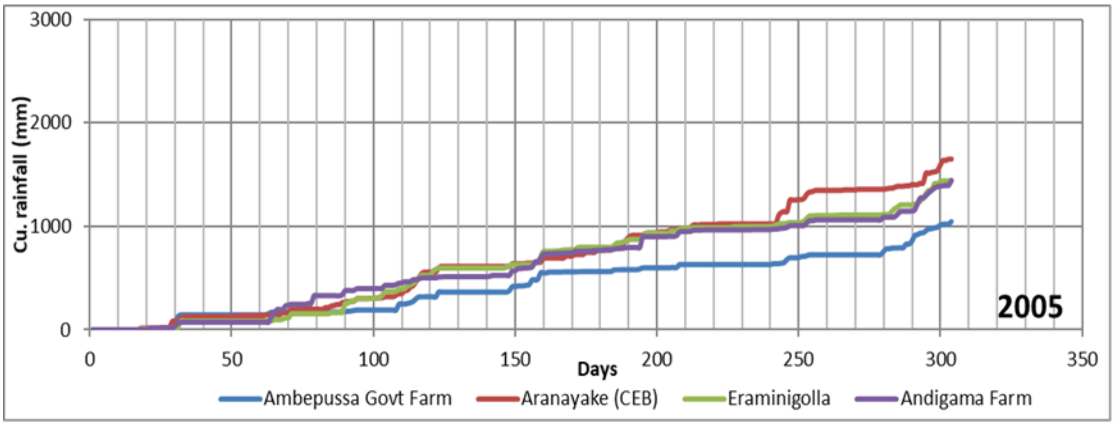

Stream flow (mm/day)
Rainfall (mm/day)
Days
Rainfall (Eraminigolla)
Streamflow
2011

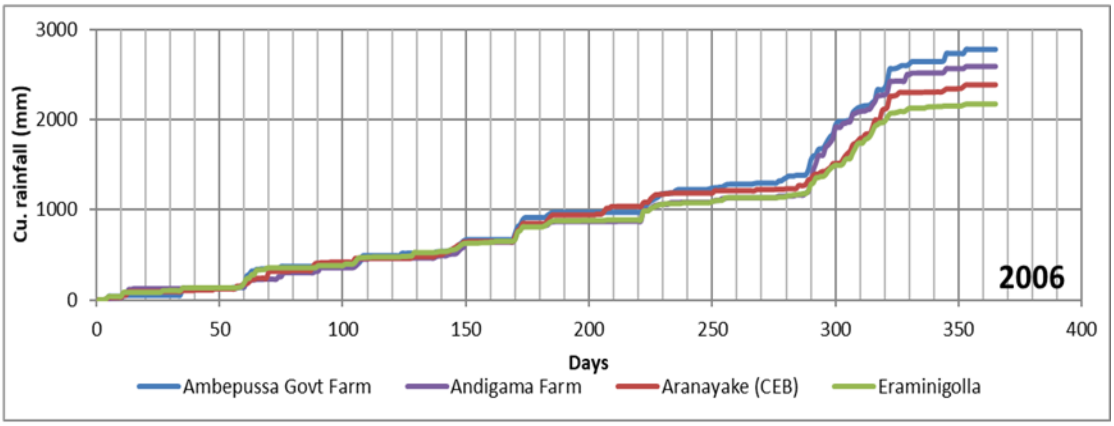

Stream flow (mm/day)
Rainfall (mm/day)
Days
Rainfall (Eraminigolla)
Streamflow
2012

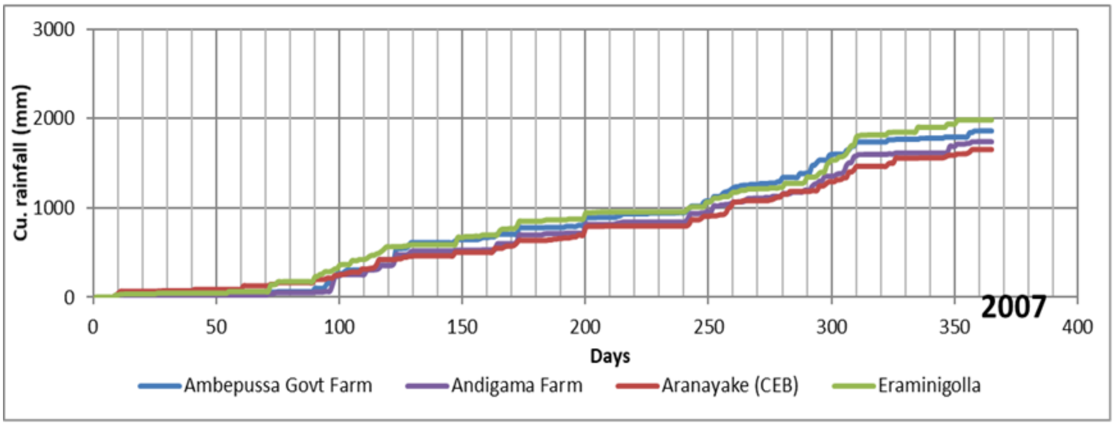

Stream flow (mm/day)
Rainfall (mm/day)
Days
Rainfall (Eraminigolla)
Streamflow
2013

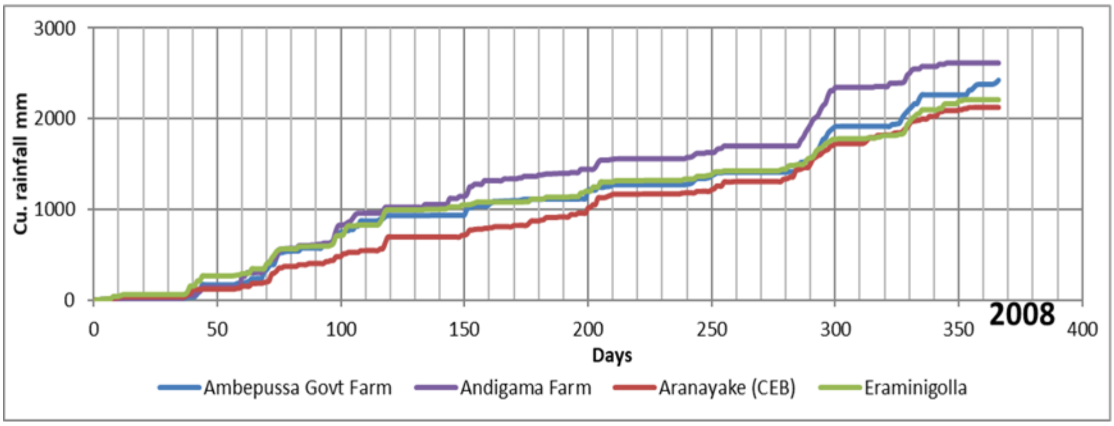
Appendix B: Single mass curve without filling missing data in calibration and validation period

Single mass curve without filling missing data in calibration period

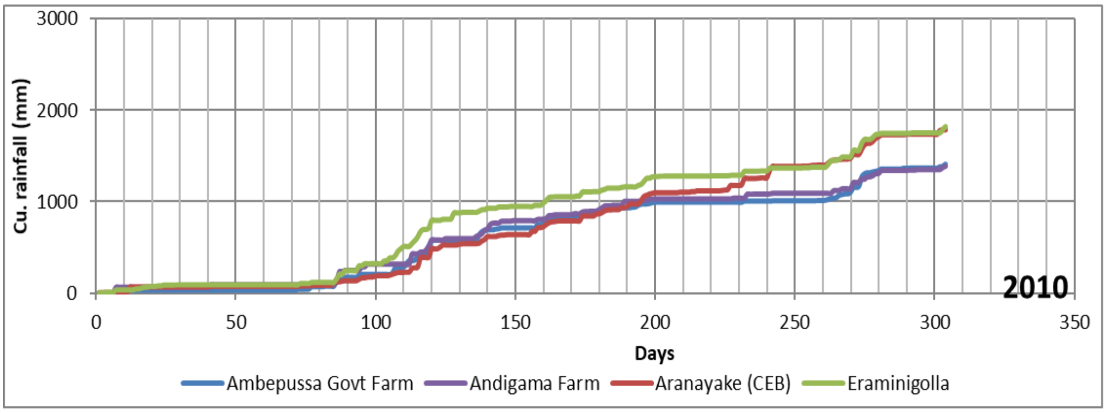


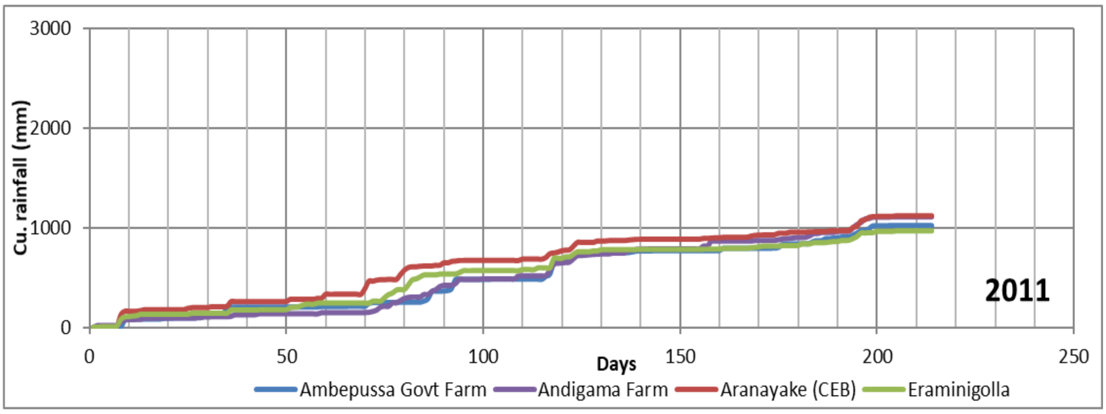


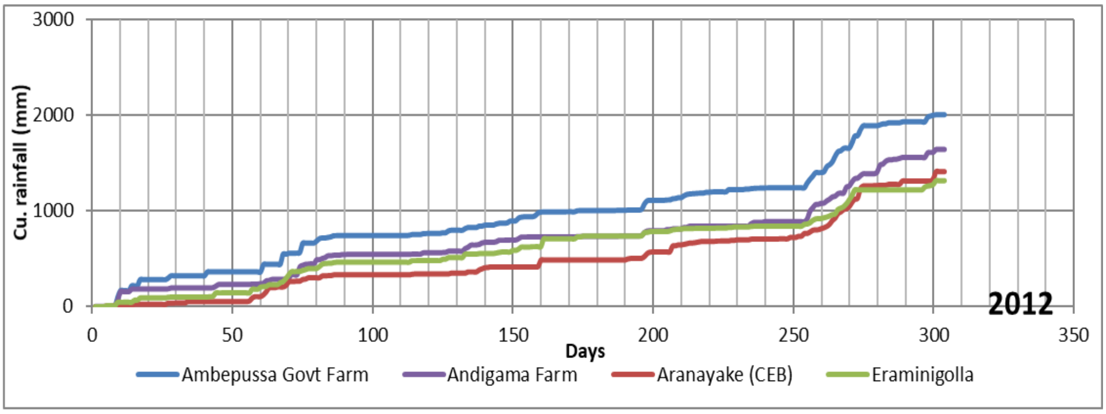


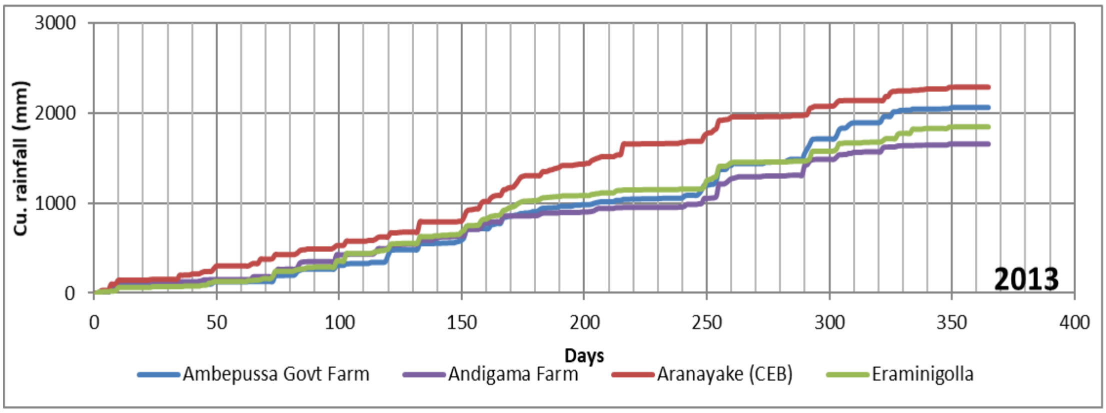


Single mass curve without filling missing data in validation period

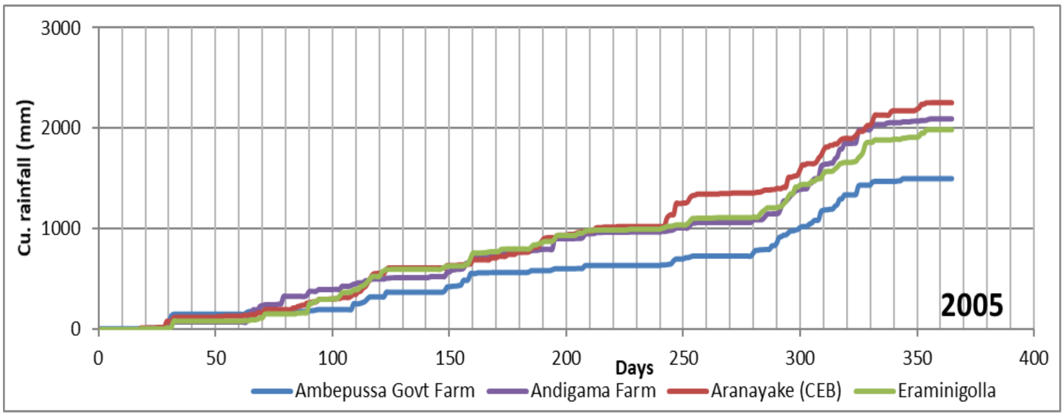


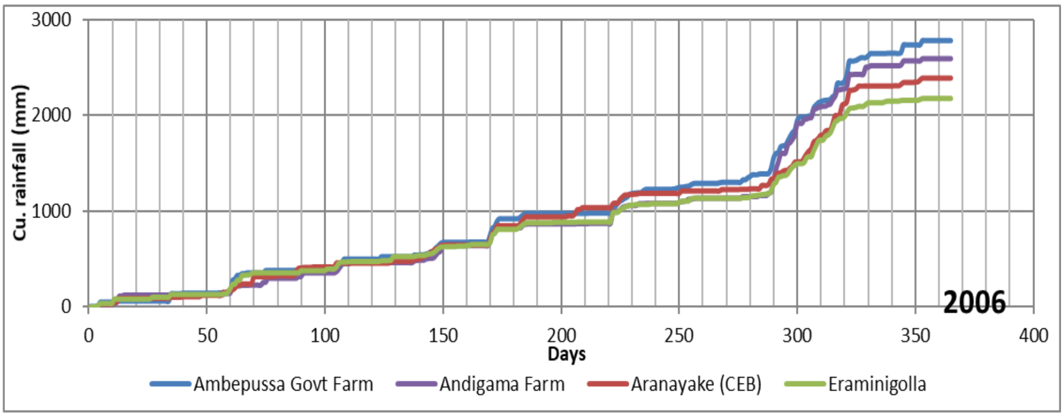


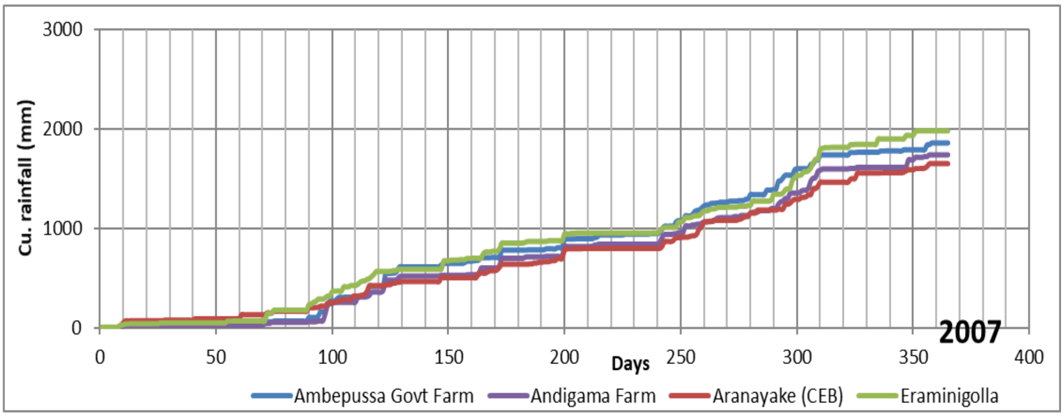


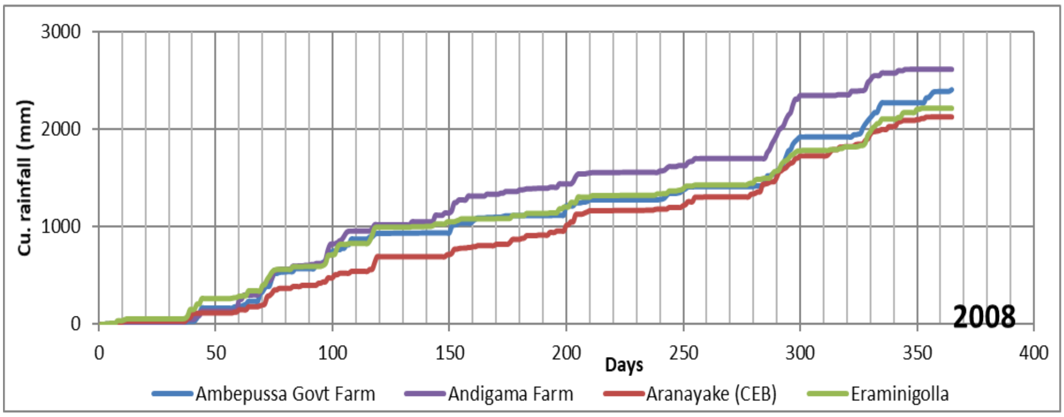


Single mass curve with filling missing data in calibration period

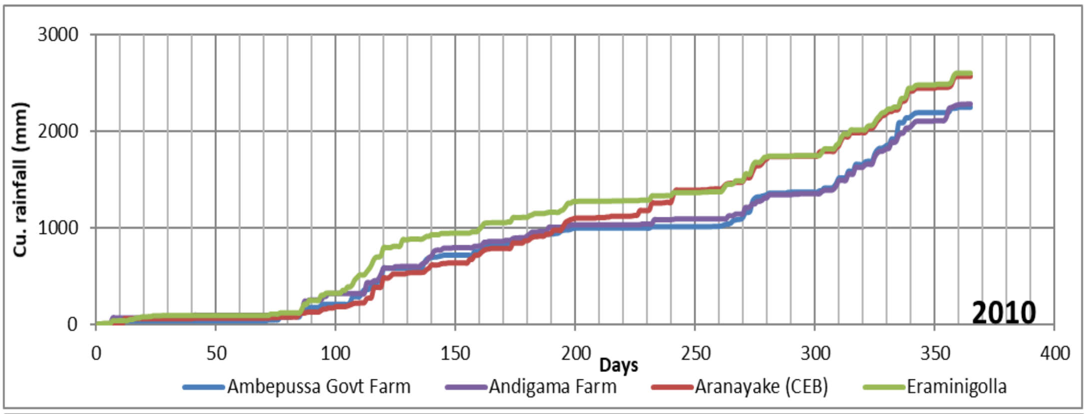


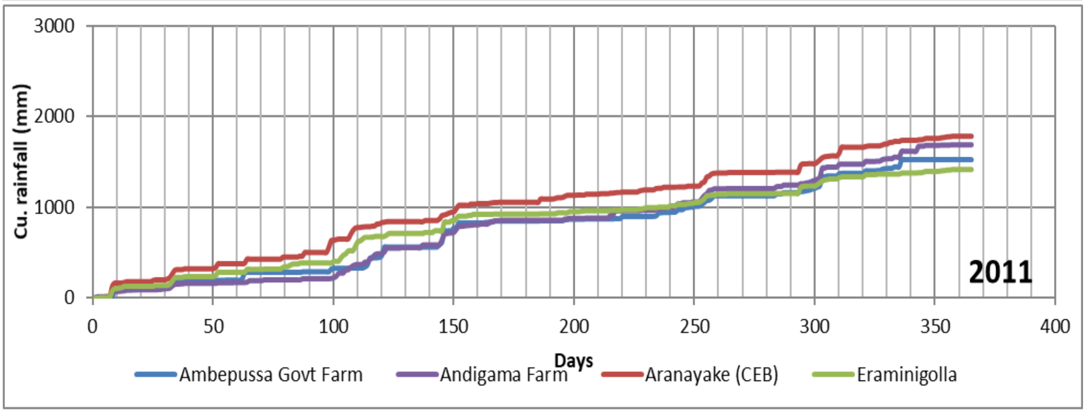


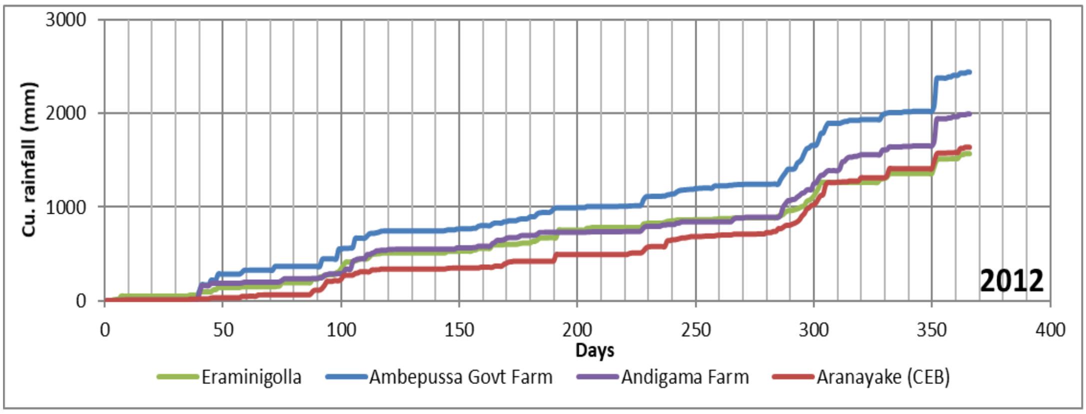


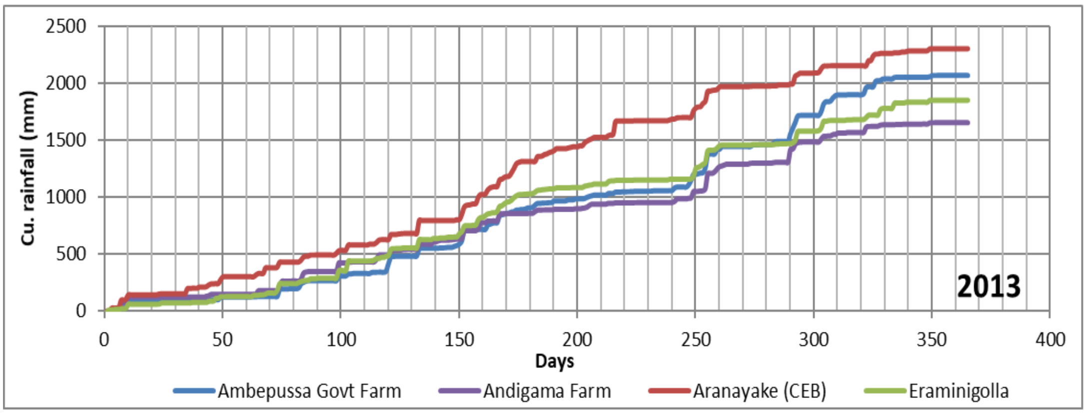


Single mass curve with filling missing data in validation period









Appendix C: Parameters of lumped and subdivision model and Thiessen weights

Thiessen weights for Nine Sub division Model

Subdivision	Area of sub division	Shape Area	Thiessen Area (km^2)	Rainfall station	Weight
Subdivision 1	104.05	68.45	342.0	Ambepussa Govt. Farm	0.658
Subdivision 1	104.05	35.56	192.0	Andigama Farm	0.342
Subdivision 2	97.85	32.51	342.0	Ambepussa Govt. Farm	0.332
Subdivision 2	97.85	65.31	192.0	Andigama	0.667
Subdivision 3	142.55	142.55	342.0	Ambepussa Govt. Farm	1.000
Subdivision 4	153.93	40.78	342.0	Ambepussa Govt. Farm	0.265
Subdivision 4	153.93	24.22	474.0	Eraminigolla	0.157
Subdivision 4	153.93	91.12	192.0	Andigama	0.592
Subdivision 5	167.16	56.74	342.0	Ambepussa Govt. Farm	0.339
Subdivision 5	167.16	7.13	264.0	Aranayake (CEB)	0.043
Subdivision 5	167.16	103.29	474.0	Eraminigolla	0.618
Subdivision 6	149.97	0.53	342.0	Ambepussa Govt. Farm	0.004

Subdivision	Area of sub division	Shape Area	Thiessen Area (km^2)	Rainfall station	Weight
Subdivision 6	149.97	1.48	264.0	Aranayake (CEB)	0.010
Subdivision 6	149.97	147.95	474.0	Eraminigolla	0.987
Subdivision 7	174.13	5.08	264.0	Aranayake (CEB)	0.029
Subdivision 7	174.13	168.98	474.0	Eraminigolla	0.970
Subdivision 8	127.98	98.59	264.0	Aranayake (CEB)	0.770
Subdivision 8	127.98	29.35	474.0	Eraminigolla	0.229
Subdivision 9	151.67	152.09	264.0	Aranayake (CEB)	1.003

Optimum Parameters of subdivisions:

Sub division 3				
Parameters	**Initial Lumped Value**	**Optimized Parameter Value for sub division 1**	**Optimized Parameter Value for sub division 2**	**Optimized Parameter Value for sub division 3**
Initial Discharge	10	5	5	5
Ratio to peak	0.164	0.164	0.164	0.164
Recession-constant	0.923	0.923	0.923	0.923
Time of concentration	79	61	67	77
soil storage	445	310	310	310
Max infiltration	4.5	4.51	4.51	4.51
Storage Coefficient	59	49	50	58
Soil Percolation (mm/Hr)	0.32	0.45	0.45	0.45
Impervious	9.55	8	11	5
Soil %	90	90	90	90
Groundwater 1(%)	80	80	80	80
Groundwater 2(%)	90	90	90	90
Tension Storage (mm)	21	21	21	21
Groundwater 1 storage	70	120	120	120
GW1 Percolation (mm/HR)	0.3	0.3	0.3	0.3
GW1 Coefficient (HR)	10	10	10	10
GW2 Storage (mm)	10	10	10	10
GW2 Percolation (mm/hr)	0.3	0.3	0.3	0.3
GW2 Coefficient (Hr)	30	30	30	30

Sub division 6							
Parameters	**Initial Lumped Value**	**Optimized Parameter Value for sub division 1**	**Optimized Parameter Value for sub division 2**	**Optimized Parameter Value for sub division 3**	**Optimized Parameter Value for sub division 4**	**Optimized Parameter Value for sub division 5**	**Optimized Parameter Value for sub division 6**
Initial Discharge	10	2	2	2	2	2	2
Ratio to peak	0.164	0.164	0.164	0.164	0.164	0.164	0.164
Recession-constant	0.923	0.923	0.923	0.923	0.923	0.923	0.923
Time of concentration	79	61	61	61	61	61	61
soil storage	445	250	250	320	300	150	300
Max infiltration	4.5	4.54	4.54	4.54	4.54	4.5	4.5
Storage Coefficient	59	49	49	49	49	49	49
Soil Percolation (mm/Hr)	0.32	0.56	0.56	0.56	0.56	0.56	0.56
Impervious	9.55	8	8	10	10	114	13
Soil %	90	90	90	90	90	90	90
Groundwater 1(%)	80	80	80	80	80	80	80
Groundwater 2(%)	90	90	90	90	90	90	90
Tension Storage (mm)	21	21	21	21	21	21	21
Groundwater 1 storage	70	70	70	70	70	70	70

Parameters	**Initial Lumped Value**	**Optimized Parameter Value for sub division 1**	**Optimized Parameter Value for sub division 2**	**Optimized Parameter Value for sub division 3**	**Optimized Parameter Value for sub division 4**	**Optimized Parameter Value for sub division 5**	**Optimized Parameter Value for sub division 6**
GW1 Percolation (mm/HR)	0.3	0.35	0.35	0.35	0.35	0.35	0.35
GW1 Coefficient (HR)	10	10	10	10	10	10	10
GW2 Storage (mm)	10	10	10	10	10	10	10
GW2 Percolation (mm/hr)	0.3	0.3	0.3	0.3	0.3	0.3	0.3
GW2 Coefficient (Hr)	30	30	30	30	30	30	30

Sub division 9										
Parameters	**Initial Lumped Value**	**Optimized Parameter Value for sub division 1**	**Optimized Parameter Value for sub division 2**	**Optimized Parameter Value for sub division 3**	**Optimized Parameter Value for sub division 4**	**Optimized Parameter Value for sub division 5**	**Optimized Parameter Value for sub division 6**	**Optimized Parameter Value for sub division 7**	**Optimized Parameter Value for sub division 8**	**Optimized Parameter Value for sub division 9**
Initial Discharge	10	2	2	2	2	2	2	2	2	2
Ratio to peak	0.164	0.164	0.164	0.164	0.164	0.164	0.164	0.164	0.164	0.164
Recession-constant	0.923	0.923	0.923	0.923	0.923	0.923	0.923	0.923	0.923	0.923
Time of concentration	79	65	68	70	69	72	68	68	70	66
soil storage	445	250	195	250	190	300	350	400	250	380
Max infiltration	4.5	4.54	4.54	4.54	4.54	4.54	4.54	5.1	4.54	4.54
Storage Coefficient	59	54	54	55	50	50	52	55	57	50
Soil Percolation (mm/Hr)	0.32	0.45	0.45	0.45	0.45	0.56	0.56	0.56	0.45	0.45
Impervious	9.55	9.5	6	10	10	5	9	8	13	11
Soil %	90	90	90	90	90	90	90	90	90	90

Sub division 9										
Parameters	**Initial Lumped Value**	**Optimized Parameter Value for sub division 1**	**Optimized Parameter Value for sub division 2**	**Optimized Parameter Value for sub division 3**	**Optimized Parameter Value for sub division 4**	**Optimized Parameter Value for sub division 5**	**Optimized Parameter Value for sub division 6**	**Optimized Parameter Value for sub division 7**	**Optimized Parameter Value for sub division 8**	**Optimized Parameter Value for sub division 9**
Groundwater 1(%)	80	80	80	80	80	80	80	80	80	80
Groundwater 2(%)	90	90	90	90	90	90	90	90	90	90
Tension Storage (mm)	21	21	21	21	21	21	21	21	21	21
Groundwater 1 storage	70	70	70	70	70	70	70	70	70	70
GW1 Percolation (mm/HR)	0.3	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35
GW1 Coefficient (HR)	10	10	10	10	10	10	10	10	10	10
GW2 Storage (mm)	10	10	10	10	10	10	10	10	10	10
GW2 Percolation (mm/hr)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
GW2 Coefficient (Hr)	30	30	30	30	30	30	30	30	30	30

Sub division 16																	
Parameters	**Lumped model**	**sub division 1**	**sub division 2**	**sub divis ion 3**	**sub divis ion 4**	**sub divis ion 5**	**sub divis ion 6**	**sub divis ion 7**	**sub divis ion 8**	**sub divis ion 9**	**sub divis ion 10**	**sub divis ion 11**	**sub divisio n12**	**sub division 113**	**sub divisio n14**	**subdivisi on15**	**sub divis ion 16**
Initial Discharge	10	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Ratio to peak	0.164	0.164	0.164	0.164	0.164	0.164	0.164	0.164	0.164	0.164	0.164	0.164	0.164	0.164	0.164	0.164	0.164
Recession-constant	0.923	0.923	0.923	0.923	0.923	0.923	0.923	0.923	0.923	0.923	0.923	0.923	0.923	0.923	0.923	0.923	0.923
Time of concentration	79	67	68	68	71	71	70	72	69	70	70	70	62	65	69	65	60
soil storage	445	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300
Max infiltration	4.5	4.54	4.54	4.54	4.54	4.54	4.54	4.54	4.54	4.54	4.54	4.54	4.54	4.54	4.54	4.54	4.54
Storage Coefficient	59	50	51	50	51	51	51	55	50	51	52	52	55	55	49	52	51
Soil Percolation (mm/Hr)	0.32	0.5	0.5	0.5	0.45	0.5	0.5	0.5	0.5	0.5	0.5	0.45	0.5	0.5	0.5	0.5	0.5
Impervious	9.55	10	5	8	9	6	7	8	5	9	6	10	8	10	10	8	10
Soil %	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90

Sub division 16																
Parameters	**Lumped model**	**sub division 1**	**sub division 2**	**sub divis ion 3**	**sub divis ion 4**	**sub divis ion 5**	**sub divis ion 6**	**sub divis ion 7**	**sub divis ion 8**	**sub divis ion 9**	**sub divis ion 10**	**sub divis ion 11**	**sub divisio n12**	**sub division 113**	**sub divisio n14**	**subdivisi on15**	**sub divis ion 16**
Groundwater 1(%)	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80
Groundwater 2(%)	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90
Tension Storage (mm)	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21	21
Groundwater 1 storage	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70
GW1 Percolation (mm/HR)	0.3	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35
GW1 Coefficient (HR)	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
GW2 Storage (mm)	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
GW2 Percolation (mm/hr)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
GW2 Coefficient (Hr)	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30

Appendix D: Statically T-test for lumped and six subdivisions

Lumped model with Sub division 1 model		
t-Test: Two-Sample Assuming Unequal Variances		
	366	376
Mean	105	100
Variance	3200	4418
Observations	2	2
Hypothesized Mean Difference	0	
df	2	
t Stat	0.081	
P(T<=t) one-tail	0.471	
t Critical one-tail	2.920	
P(T<=t) two-tail	0.943	
t Critical two-tail	4.303	

Lumped model with Sub division 2 model		
t-Test: Two-Sample Assuming Unequal Variances		
	366	376
Mean	105	100
Variance	3200	4418
Observations	2	2
Hypothesized Mean Difference	0	
df	2	
t Stat	0.081	
P(T<=t) one-tail	0.471	
t Critical one-tail	2.920	
P(T<=t) two-tail	0.943	
t Critical two-tail	4.303	

Lumped model with Sub division 3 model		
t-Test: Two-Sample Assuming Unequal		
	366	373
Mean	105	101.5
Variance	3200	2964.5
Observations	2	2
Hypothesized Mean Difference	0	
df	2	
t Stat	0.063	
P(T<=t) one-tail	0.477	
t Critical one-tail	2.920	
P(T<=t) two-tail	0.955	
t Critical two-tail	4.303	

Lumped model with Sub division 4 model		
t-Test: Two-Sample Assuming Unequal Variances		
	366	382
Mean	105	97
Variance	3200	1568
Observations	2	2
Hypothesized Mean Difference	0	
df	2	
t Stat	0.164	
P(T<=t) one-tail	0.442	
t Critical one-tail	2.920	
P(T<=t) two-tail	0.885	
t Critical two-tail	4.303	

Lumped model with Sub division 5 model		
t-Test: Two-Sample Assuming Unequal Variances		
	366	367
Mean	105	104.5
Variance	3200	1404.5
Observations	2	2
Hypothesized Mean Difference	0	
df	2	
t Stat	0.01	
P(T<=t) one-tail	0.496	
t Critical one-tail	2.91998558	
P(T<=t) two-tail	0.992631705	
t Critical two-tail	4.30265273	

Lumped model with Sub division 6 model		
t-Test: Two-Sample Assuming Unequal Variances		
	366	361
Mean	105	107.5
Variance	3200	1624.5
Observations	2	2
Hypothesized Mean Difference	0	
df	2	
t Stat	-0.051	
P(T<=t) one-tail	0.482	
t Critical one-tail	2.920	
P(T<=t) two-tail	0.964	
t Critical two-tail	4.302	

Appendix E: Watershed subdivisions approach

Authors	Literature support	Methods
Kanchanamala, D. P. H. M., Herath, H. M. H. K., & Nandalal, K. D. W	Kanchanamala, D. P. H. M., Herath, H. M. H. K., & Nandalal, K. D. W. (2016). Impact of Catchment Scale on Rainfall Runoff Modeling: Kalu Ganga River Catchment upto Ratnapura. *Engineer: Journal of the Institution of Engineers, Sri Lanka*, *49*(2),	River network ,Landuse and Landuse
Kim, J.-G., Park, Y., Yoo, D., Kim, N.-W., Engel, B. A., Kim, S., Lim, K. J	Kim, J.-G., Park, Y., Yoo, D., Kim, N.-W., Engel, B. A., Kim, S., … Lim, K. J. (2009). Development of a SWAT Patch for Better Estimation of Sediment Yield in Steep Sloping Watersheds1. *JAWRA Journal of the American Water Resources Association*, *45*(4), 963–9	Threshold Area Using Stream Network
Zhang, H. L., Wang, Y. J., Wang, Y. Q., Li, D. X., & Wang, X. K.	Zhang, H. L., Wang, Y. J., Wang, Y. Q., Li, D. X., & Wang, X. K. (2013). The effect of watershed scale on HEC-HMS calibrated parameters: a case study in the Clear Creek watershed in Iowa, US. *Hydrol. Earth Syst. Sci.*, *17*(7), 2735–2745	Threshold Area Using Stream Network
Narayan Prasad Gautam	Narayan Prasad Gautam. (2015).Hydrological Modeling with HEC-HMS in Different Channel Sections in Case of Gandaki River ,Basin Global Journals Inc.,(USA) 2249-4596	Stream Network
Manoj Jha, Philip W. Gassman, Silvia Secchi, Roy Gu, and Jeff Arnold	Manoj Jha, Philip W. Gassman, Silvia Secchi, Roy Gu, and Jeff Arnold,(2004).EFFECT OF WATERSHED SUBDIVISION ON SWAT FLOW,SEDIMENT, AND NUTRIENT PREDICTIONS	Randomly using stream network
Tripathi, M. P., Raghuwanshi, N. S., & Rao, G. P	Tripathi, M. P., Raghuwanshi, N. S., & Rao, G. P. (2006). Effect of watershed subdivision on simulation of water balance components. *Hydrological Processes*, *20*, 1137–1156.	Automatic Delineation

Authors	Literature support	Methods
(Luong, 2008)	(Luong, 2008).Cleveland Subdivision of Texas Watersheds for Hydrologic Modeling, Texas Tech University College of Engineering	Equal Area Method
Wingeld (2008)	David B. Thompson, Theodore G. (2009).Cleveland Subdivision of Texas Watersheds for Hydrologic Modeling, Texas Tech University College of Engineering	Heuristic Approach

Appendix F:Evaluation criteria for AMC calculations

Authors	**Literature Supports**	**Verify in Literature**	**RMSE (mm)**	**Rank**
Sobhani	Sobhani G (1975) A review of selected small watershed design methods for possible adoption to Iranian conditions. M.S. Thesis, Utah State University, Logan, UT	S. K. Mishra & M. K. Jain & P. Suresh Babu &K. Venugopal & S. Kaliappan(200).Comparison of AMC-dependent CN-conversion Formulae,Water Resour Manage (2008) 22:1409–1420	13.683	2
Hawkins et al.	Hawkins RH, Hjelmfelt AT Jr, Zevenbergen AW (1985) Runoff probability, storm depth and curve numbers.J Irrig Drain Eng ASCE 111(4):330–340	S. K. Mishra & M. K. Jain & P. Suresh Babu &K. Venugopal & S. Kaliappan(200).Comparison of AMC-dependent CN-conversion Formulae,Water Resour Manage (2008) 22:1409–1420	13.509	1
Chow et al.	Chow VT, Maidment DR, Mays LW (1988) Applied hydrology. McGraw-Hill, New York	S. K. Mishra & M. K. Jain & P. Suresh Babu &K. Venugopal & S. Kaliappan(200).Comparison of AMC-dependent CN-conversion Formulae,Water Resour Manage (2008) 22:1409–1420	13.776	3

Authors	**Literature Supports**	**Verify in Literature**	**RMSE (mm)**	**Rank**
Neitsch et al.	Neitsch SL, Arnold JG, Kiniry JR, Williams JR, King KW (2002) Soil and water assessment tool (SWAT):theoretical documentation, version 2000. Texas Water Resources Institute, College Station, TX, TWRI Report TR-191	S. K. Mishra & M. K. Jain & P. Suresh Babu &K. Venugopal & S. Kaliappan(200).Comparison of AMC-dependent CN-conversion Formulae,Water Resour Manage (2008) 22:1409–1420	13.865	4