

Sustainable Rainwater Management and Life Cycle Assessment: Challenges and Perspectives

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Supplementary data - Sustainable Rainwater Management and LCA: Challenges and Perspectives

Table S1. Selected articles (continues).

Count	Title	Authors	Year	DOI
1	Techno-economic and sensitivity analysis of rainwater harvesting system as alternative water source	Abas P.E., Mahlia T.M.I.	2019	10.3390/su11082365
2	Economic and environmental analysis of standard, high efficiency, rainwater flushed, and composting toilets	Anand C., Apul D.S.	2011	10.1016/j.jenvman.2010.08.005
3	Environmental analysis of rainwater harvesting infrastructures in diffuse and compact urban models of Mediterranean climate	Angrill S., Farreny R., Gasol C.M., Gabarrell X., Viñolas B., Josa A., Rieradevall J.	2012	10.1007/s11367-011-0330-6
4	Environmental performance of rainwater harvesting strategies in Mediterranean buildings	Angrill S., Segura-Castillo L., Petit-Boix A., Rieradevall J., Gabarrell X., Josa A.	2017	10.1007/s11367-016-1174-x
5	Environmental assessment of a permeable pavement system used to harvest stormwater for non-potable water uses in a building	Antunes L.N., Ghisi E., Severis R.M.	2020	10.1016/j.scitotenv.2020.141087
6	Reduction of environmental impacts due to using permeable pavements to harvest stormwater	Antunes L.N., Sydney C., Ghisi E., Phoenix V.R., Thives L.P., White C., Garcia E.S.H.	2020	10.3390/w12102840
7	Onsite Non-potable Reuse for Large Buildings: Environmental and Economic Suitability as a Function of Building Characteristics and Location	Arden S., Morelli B., Cashman S., Ma X.C., Jahne M., Garland J.	2021	10.1016/j.watres.2020.116635
8	Reducing life-cycle carbon footprint in the (re)design of water distribution systems using water demand management interventions	Basupi I., Kapelan Z., Butler D.	2014	10.1080/1573062X.2012.750374

Table S1. Selected articles (continues).

Count	Title	Authors	Year	DOI
9	Environmental impact analysis of a water supply system: Study of an Indian university campus	Bhakar V., Sihag N., Gieschen R., Andrew S., Herrmann C., Sangwan K.S.	2015	10.1016/j.procir.2015.02.061
10	Development of LCA Calculator to support community infrastructure co-design	Borrion A., Matsushita J., Austen K., Johnson C., Bell S.	2019	10.1007/s11367-018-1492-2
11	Life cycle assessment of point source emissions and infrastructure impacts of four types of urban stormwater systems	Brudler S.; Arnbjerg- Nielsen K.; Hauschild M.Z.; Ammitsøe C.; Hénonin J.; Rygaard M.	2019	10.1016/j.watres.2019.03.044
12	Life cycle assessment of stormwater management in the context of climate change adaptation	Brudler S.; Arnbjerg- Nielsen K.; Hauschild M.Z.; Rygaard M.	2016	10.1016/j.watres.2016.10.024
13	Water-supply options in arsenic-affected regions in Cambodia: Targeting the bottom income quintiles	Chamberlain J.F., Sabatini D.A.	2014	10.1016/j.scitotenv.2013.12.011
14	Economic and Energy Efficiency of Net-Zero Water Communities: System Dynamics Analysis	Chhipi-Shrestha G., Hewage K., Sadiq R.	2018	10.1061/JSWBAY.0000854
15	Development and application of EEAST: A life cycle based model for use of harvested rainwater and composting toilets in buildings	Devkota J., Schlachter H., Anand C., Phillips R., Apul D.	2013	10.1016/j.jenvman.2013.09.015
16	Life cycle based evaluation of harvested rainwater use in toilets and for irrigation	Devkota J., Schlachter H., Apul D.	2015	10.1016/j.jclepro.2015.02.021
17	Introducing demand to supply ratio as a new metric for understanding life cycle greenhouse gas (GHG) emissions from rainwater harvesting systems	Devkota J.P., Burian S.J., Tavakol-Davani H., Apul D.S.	2017	10.1016/j.jclepro.2015.10.073
18	Stormwater management for highly urbanized areas in the tropics: Life cycle assessment of low impact development practices	dos Santos M.F.N.; Barbassa A.P.; Vasconcelos A.F.; Ometto A.R.	2021	10.1016/j.jhydrol.2021.126409
19	An eco-efficiency evaluation of community-scale rainwater and stormwater harvesting in Aarhus, Denmark	Faragò M., Brudler S., Godskesen B., Rygaard M.	2019	10.1016/j.jclepro.2019.01.265

Table S1. Selected articles (continues).

Count	Title	Authors	Year	DOI
20	Cost-efficiency of rainwater harvesting strategies in dense Mediterranean neighbourhoods	Farreny R., Gabarrell X., Rieradevall J.	2011	10.1016/j.resconrec.2011.01.008
21	Economic and environmental analysis of five Chinese rural toilet technologies based on the economic input–output life cycle assessment	Gao H., Zhou C., Li F., Han B., Li X.	2017	10.1016/j.jclepro.2015.12.089
22	Environmental and economic analysis for the optimal reuse of water in a residential complex	García-Montoya M., Sengupta D., Nápoles-Rivera F., Ponce-Ortega J.M., El-Halwagi M.M.	2016	10.1016/j.jclepro.2015.06.109
23	Holistic impact assessment and cost savings of rainwater harvesting at the watershed scale	Ghimire S.R., Johnston J.M.	2017	10.1525/elementa.135
24	A modified eco-efficiency framework and methodology for advancing the state of practice of sustainability analysis as applied to green infrastructure	Ghimire S.R., Johnston J.M.	2017	10.1002/ieam.1928
25	Life cycle assessment of a rainwater harvesting system compared with an AC condensate harvesting system	Ghimire S.R., Johnston J.M., Garland J., Edelen A., Ma X.C., Jahne M.	2019	10.1016/j.resconrec.2019.01.043
26	Life cycle assessment of domestic and agricultural rainwater harvesting systems	Ghimire S.R., Johnston J.M., Ingwersen W.W., Hawkins T.R.	2014	10.1021/es500189f
27	Life cycle assessment of a commercial rainwater harvesting system compared with a municipal water supply system	Ghimire S.R., Johnston J.M., Ingwersen W.W., Sojka S.	2017	10.1016/j.jclepro.2017.02.025
28	ASTA — A method for multi-criteria evaluation of water supply technologies to Assess the most Sustainable Alternative for Copenhagen	Godskesen B., Hauschild M., Albrechtsen H.-J., Rygaard M.	2018	10.1016/j.scitotenv.2017.11.018
29	Life-cycle and freshwater withdrawal impact assessment of water supply technologies	Godskesen B., Hauschild M., Rygaard M., Zambrano K., Albrechtsen H.-J.	2013	10.1016/j.watres.2013.02.005
30	Environmental performance of a hybrid rainwater harvesting and greywater reuse system: A case study on a high water consumption household in Colombia	Gómez-Monsalve M., Domínguez I.C., Yan X., Ward S., Oviedo-Ocaña E.R.	2022	10.1016/j.jclepro.2022.131125

Table S1. Selected articles (continues).

Count	Title	Authors	Year	DOI
31	Rainwater utilization from roof catchments in arid regions: A case study for Australia	Hajani E., Rahman A.	2014	10.1016/j.jaridenv.2014.07.007
32	Lifecycle assessment analysis of engineered stormwater control methods common to urban watersheds	Hengen T.J.; Sieverding H.L.; Stone J.J.	2016	10.1061/(ASCE)WR.1943-5452.0000647
33	Rainwater harvesting for drinking water production: A sustainable and cost-effective solution in The Netherlands?	Hofman-Caris R., Bertelkamp C., de Waal L., van den Brand T., Hofman J., van der Aa R., van der Hoek J.P.	2019	10.3390/w11030511
34	Life cycle assessment of low impact development technologies combined with conventional centralized water systems for the City of Atlanta, Georgia	Jeong H., Broesicke O.A., Drew B., Li D., Crittenden J.C.	2016	10.1007/s11783-016-0851-0
35	The role of climate change and decentralization in urban water services: A dynamic energy-water nexus analysis	Khalkhali M., Dilkina B., Mo W.	2021	10.1016/j.watres.2021.117830
36	Life-cycle assessment and life-cycle cost analysis of decentralised rainwater harvesting, greywater recycling and hybrid rainwater-greywater systems	Leong J.Y.C., Balan P., Chong M.N., Poh P.E.	2019	10.1016/j.jclepro.2019.05.046
37	Multi-objective optimization integrated with life cycle assessment for rainwater harvesting systems	Li Y., Huang Y., Ye Q., Zhang W., Meng F., Zhang S.	2018	10.1016/j.jhydrol.2018.02.007
38	Alternative water supply solutions: China's South-to-North-water-diversion in Jinan	Liu Y., Wang M., Webber M., Zhou C., Zhang W.	2020	10.1016/j.jenvman.2020.111337
39	Assessment of the environmental impact and investment feasibility analysis of rainwater use in houses	Marinoski A.K., Ghisi E.	2011	10.2495/RAV110361
40	Environmental performance of hybrid rainwater-greywater systems in residential buildings	Marinoski A.K., Ghisi E.	2019	10.1016/j.resconrec.2019.01.035
41	Environmental benefit analysis of strategies for potable water savings in residential buildings	Marinoski A.K., Rupp R.F., Ghisi E.	2018	10.1016/j.jenvman.2017.10.004
42	Life cycle energy assessment and economic feasibility of stormwater harvested from pervious pavements	Martins Vaz I.C., Ghisi E., Thives L.P.	2020	10.1016/j.watres.2019.115322
43	Financial and environmental modelling of water hardness - Implications for utilising harvested rainwater in washing machines	Morales-Pinzón T., Lurueña R., Gabarrell X., Gasol C.M., Rieradevall J.	2014	10.1016/j.scitotenv.2013.10.101

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Count	Title	Authors	Year	DOI
44	Modelling for economic cost and environmental analysis of rainwater harvesting systems	Morales-Pinzón T., Rieradevall J., Gasol C.M., Gabarrell X.	2015	10.1016/j.jclepro.2014.10.021
45	A Financial, Environmental and Social Evaluation of Domestic Water Management Options in the West Bank, Palestine	Nazer D.W., Siebel M.A., van der Zaag P., Mimi Z., Gijzen H.J.	2010	10.1007/s11269-010-9667-z
46	A Scenario-Driven Assessment of the Economic Feasibility of Rainwater Harvesting Using Optimized Storage	Nnaji C.C., Aigbavboa C.	2020	10.1007/s11269-019-02462-x
47	The design of net-zero-energy affordable housing in Philadelphia	Ozcan-Deniz G., Fryer R., Ferreira A.C.A.	2018	10.3390/designs2030026
48	Economic and environmental assessment of two different rain water harvesting systems for agriculture	Pari L., Suardi A., Stefanoni W., Latterini F., Palmieri N.	2021	10.3390/su13073871
49	Life cycle and hydrologic modeling of rainwater harvesting in urban neighborhoods: Implications of urban form and water demand patterns in the US and Spain	Petit-Boix A., Devkota J., Phillips R., Vargas-Parra M.V., Josa A., Gabarrell X., Rieradevall J., Apul D.	2018	10.1016/j.scitotenv.2017.11.206
50	Life-cycle perspective on residential water conservation strategies	Racoviceanu A.I., Karney B.W.	2010	10.1061/(ASCE)1076- 0342(2010)16:1(40)
51	Rainwater harvesting in Greater Sydney: Water savings, reliability and economic benefits	Rahman A., Keane J., Imteaz M.A.	2012	10.1016/j.resconrec.2011.12.002
52	Rainwater harvesting impacts on environment	Rashid A.R.M., Bhuiyan M.A., Jayasuriya N.	2016	-
53	Life cycle assessment of rainwater harvesting system components – To determine environmentally sustainable design	Rashid A.R.M., Bhuiyan M.A., Pramanik B., Jayasuriya N.	2021	10.1016/j.jclepro.2021.129286
54	A comparison of environmental impacts between rainwater harvesting and rain garden scenarios	Rashid A.R.M., Bhuiyan M.A., Pramanik B., Jayasuriya N.	2022	10.1016/j.psep.2021.12.047
55	Feasibility of rainwater harvesting on Scott Laboratory	Shah D., Patel P., Kudo P., Steinberg A., Herold W.	2013	10.1109/GHTC.2013.6713712

Table S1. Selected articles (continues).

Count	Title	Authors	Year	DOI
56	Performance of water efficiency measures in commercial buildings	Sousa V., Silva C.M., Meireles I.	2019	10.1016/j.resconrec.2019.01.013
57	Analysis of profitability of rainwater harvesting, gray water recycling and drain water heat recovery systems	Stec A., Kordana S.	2015	10.1016/j.resconrec.2015.10.006
58	Lifecycle Analysis of a Single-Family Residential Rainwater Harvesting System in a Subtropical, Metropolitan Environment	Sweeney J.F., Pate M.B.	2017	10.1061/JSWBAY.0000832
59	Comparative life cycle assessment of three alternative techniques for increasing potable water supply in cities in the Global South	Tarpani R.R.Z., Lapolli F.R., Lobo Recio M.Á., Gallego-Schmid A.	2021	10.1016/j.jclepro.2021.125871
60	Developing urban water infrastructure modeling approach to control flood damages and reduce life cycle impacts	Tavakol-Davani H., Burian S., Apul D., Devkota J.	2013	10.1061/9780784412947.291
61	A Watershed Scale Life Cycle Assessment Framework for Stormwater Management	Tavakol-Davani H., Burian S.J., Apul D.	2018	10.1061/9780784481417.030
62	Combining hydrologic analysis and life cycle assessment approaches to evaluate sustainability of water infrastructure	Tavakol-Davani H., Burian S.J., Butler D., Sample D., Devkota J., Apul D.	2018	10.1061/(ASCE)IR.1943- 4774.0001340
63	Performance and Cost-Based Comparison of Green and Gray Infrastructure to Control Combined Sewer Overflows	Tavakol-Davani H., Burian S.J., Devkota J., Apul D.	2016	10.1061/JSWBAY.0000805
64	Combining hydrologic analysis and life cycle assessment approaches to evaluate sustainability of water infrastructure: Uncertainty analysis	Tavakol-Davani H., Rahimi R., Burian S.J., Pomeroy C.A., McPherson B.J., Apul D.	2019	10.3390/w11122592
65	The environmental impact of household's water use: A case study in Flanders assessing various water sources, production methods and consumption patterns	Thomassen G., Huysveld S., Boone L., Vilain C., Geysen D., Huysman K., Cools B., Dewulf J.	2021	10.1016/j.scitotenv.2021.145398
66	The Water-Energy-Carbon Nexus: Optimising Rainwater Harvesting in Mexico City	Valdez M.C., Adler I., Barrett M., Ochoa R., Pérez A.	2016	10.1007/s40710-016-0138-2

Table S1. Selected articles (continues).

Count	Title	Authors	Year	DOI
67	Synergies of green building retrofit strategies for improving sustainability and resilience via a building-scale food-energy-water nexus	Valencia A., Zhang W., Gu L., Chang N.-B., Wanielista M.P.	2022	10.1016/j.resconrec.2021.105939
68	Rainwater harvesting systems reduce detergent use	Vargas-Parra M.V., Rovira-Val M.R., Gabarrell X., Villalba G.	2019	10.1007/s11367-018-1535-8
69	Applying exergy analysis to rainwater harvesting systems to assess resource efficiency	Vargas-Parra M.V., Villalba G., Gabarrell X.	2013	10.1016/j.resconrec.2012.12.008
70	Environmental analysis of a domestic rainwater harvesting system: A case study in France	Vialle C., Busset G., Tanfin L., Montrejaud-Vignoles M., Huau M.-C., Sablayrolles C.	2015	10.1016/j.resconrec.2015.07.024
71	Assessing cost-effectiveness of bioretention on stormwater in response to climate change and urbanization for future scenarios	Wang M.; Zhang D.; Adhityan A.; Ng W.J.; Dong J.; Tan S.K.	2016	10.1016/j.jhydrol.2016.10.019
72	Economic and environmental assessment of office building rainwater harvesting systems in various U.S. Cities	Wang R., Zimmerman J.B.	2015	10.1021/es5046887
73	Cost-benefit analysis of low-impact development at hectare scale for urban stormwater source control in response to anticipated climatic change	Wang Z.; Zhou S.; Wang M.; Zhang D.	2020	10.1016/j.jenvman.2020.110483
74	Rainwater harvesting: Environmentally beneficial for the UK?	Way C.M., Martinson D.B., Heslop S.E., Cooke R.S.	2010	10.2166/ws.2010.189
75	Performance assessment and life cycle analysis of potable water production from harvested rainwater by a decentralized system	Yan X., Ward S., Butler D., Daly B.	2018	10.1016/j.jclepro.2017.11.198
76	Modeling for sustainability: Life cycle assessment application to evaluate environmental performance of water recycling solutions at the dwelling level	Zanni S., Cipolla S.S., Fusco E.D., Lenci A., Altobelli M., Currado A., Maglionico M., Bonoli A.	2019	10.1016/j.spc.2018.09.002