University : University of Malaya
Country : Malaysia
Web Address : http://um.edu.my
Owner : UM Living Lab (Water Warriors)
: https://umwaterwarriors.wixsite.com/

CORE AREA: WATER MANAGEMENT
Water Conservation Program Implementation

MEASUREMENT OF WATER CONSERVED

1. Continuous monitoring trend of water usage in campus with all the conservation effort done on the ground

Months	Usage (m^3)						
	2011	2012	2013	2014	2015	2016	2017
January	214,050	187,106	176,325	180,523	187,618	193,872	⬆ 205,371
February	233,002	228,197	227,416	201,942	188,278	209,014	⬆ 219,535
March	245,911	235,739	240,772	231,681	229,984	231,387	⬇ 143,329
April	223,586	230,806	265,151	175,622	226,312	199,799	⬇ 135,230
May	194,059	240,803	218,692	214,703	208,933	233,880	⬇ 164,080
June	197,414	196,508	207,595	207,778	209,572	169,989	⬇ 134,840
July	184,032	164,738	165,715	178,381	203,615	181,180	⬇ 132,210
August	171,384	164,738	200,609	179,203	193,485	229,660	⬇ 81,440
September	169,437	176,040	235,300	214,578	232,269	217,254	⬇ 191,198
October	247,746	230,714	239,422	236,725	231,474	204,279	⬆ 211,006
November	219,717	213,057	145,898	216,234	222,728	226,616	⬆ 228,080
December	180,385	225,542	177,330	238,998	220,802	219,535	⬆ 236,583
Total	**2,480,723**	**2,493,988**	**2,500,225**	**2,476,368**	**2,555,070**	**2,516,465**	⬇ **2,082,902**
Average (monthly)	206,727	207,832	208,352	206,364	212,923	209,705	173,575

Source: Department of Development and Estate Maintenance (JPPHB) UM

For 2017, University of Malaya managed to reduce water usage from 2,516,465 m^3 (2016) to 2,082,902 m^3 (2017); **17.23% reduction**

2. Installation of individual meter for faculties/colleges around campus

Department of Development and Estate Maintenance 	Centre for Foundation Studies in Science 	Incubator 
Research Management and Innovation Complex 	Raja Dr. Nazrin Shah Residential College 	Swimming Pool, Sport Centre 
University of Malaya Stadium 	Tun Ahamd Zaidi Residential College 	Kinabalu Residential College 

Za'ba Residential College

Bestari Residential College

Tuanku Kurshiah Residential College

IMPLEMENTED IN RAIN HARVESTING SYSTEMS

No.	Project	Location	No. of tanks (unit)	Volume per tank (gallons)	Purpose
1	Rainwater harvesting	Tunku Abdul Rahman Residential College	3	Tank A: 400 gallons Tank B: 400 gallons Tank C: 400 gallons	For washing vehicles, watering plants, cleaning floor and other external uses.
 Tank A: 400 gallons		 Tank B: 400 gallons		 Tank C	
2	Rainwater harvesting	Tuanku Bahiyah Residential College	3	Tank A: 400 gallons Tank B: 400 gallons Tank C: 400 gallons	For washing vehicles, watering plants, cleaning floor and other external uses.
					

Tank A: 400 gallons		Tank B: 400 gallons		Tank C: 400 gallons	
3	Rainwater harvesting	Tuanku Kurshiah Residential College	3	Tank A: 400 gallons Tank B: 400 gallons Tank C: 400 gallons	For washing vehicles, watering plants, cleaning floor and other external uses.
 Tank A: 400 gallons		 Tank B: 400 gallons		 Tank C: 400 gallons	
4	Rainwater harvesting	Bestari Residential College	3	Tank A: 400 gallons Tank B: 400 gallons Tank C: 400 gallons	For washing vehicles, watering plants, cleaning floor and other external uses.
 Tank A: 400 gallons		 Tank B: 400 gallons		 Tank C: 400 gallons	

5	Rainwater harvesting	Dayasari Residential College	3	Tank A: 400 gallons Tank B: 400 gallons Tank C: 400 gallons	For washing vehicles, watering plants, cleaning floor and other external uses.
 Tank A: 400 gallons		 Tank B: 400 gallons		 Tank C: 400 gallons	
6	Rainwater harvesting	Ibnu Sina Residential College	3	Tank A: 400 gallons Tank B: 400 gallons Tank C: 400 gallons	For washing vehicles, watering plants, cleaning floor and other external uses.
 Tank A: 400 gallons		 Tank B: 400 gallons		 Tank C: 400 gallons	

7	Rain water harvesting	Za'ba Residential College	3	Tank A: 400 gallons Tank B: 400 gallons Tank C: 400 gallons	For washing vehicles, watering plants, cleaning floor and other external uses.
 Tank A: 400 gallons		 Tank B: 400 gallons		 Tank C: 400 gallons	
8	Rainwater harvesting	Kinabalu Residential College	3	Tank A: 400 gallons Tank B: 400 gallons Tank C: 400 gallons	For washing vehicles, watering plants, cleaning floor and other external uses.
 Tank A: 400 gallons		 Tank B: 400 gallons		 Tank C: 400 gallons	
9	Rainwater harvesting	Tun Syed Zahiruddin Residential College	14	Tank A: 400 gallons Tank B: 400 gallons Tank C: 400 gallons Tank D: 600 gallons Tank E: 600 gallons Tank F: 600 gallons Tank G: 600 gallons Tank H: 600 gallons Tank I: 600 gallons Tank J: 600 gallons Tank K: 600 gallons Tank L: 600 gallons Tank M: 600 gallons Tank N: 600 gallons	For washing vehicles, watering plants, cleaning floor and other external uses.

 Tank A: 400 gallons	 Tank B: 400 gallons	 Tank C: 400 gallons
 Tank D: 600 gallons	 Tank E: 600 gallons	 Tank F: 600 gallons
 Tank G: 600 gallons	 Tank H: 600 gallons	 Tank I: 600 gallons
 Tank J: 600 gallons	 Tank K: 600 gallons	 Tank L: 600 gallons

Tank M: 600 gallons

Tank N: 600 gallons

10	Rainwater harvesting	Tun Ahmad Zaidi Residential College	3	Tank A: 400 gallons Tank B: 400 gallons Tank C: 400 gallons	For washing vehicles, watering plants, cleaning floor and other external uses.

Tank A: 400 gallons

Tank B: 400 gallons

Tank C: 400 gallons

11	Rainwater harvesting	Ungku Aziz Residential College	3	Tank A: 400 gallons Tank B: 400 gallons Tank C: 400 gallons	For washing vehicles, watering plants, cleaning floor and other external uses.

Tank A: 400 gallons

Tank B: 400 gallons

Tank C: 400 gallons

<table>
<tr><td>12</td><td>Rainwater harvesting</td><td>Raja Dr. Nazrin Shah Residential College</td><td>3</td><td>Tank A: 400 gallons
Tank B: 400 gallons
Tank C: 400 gallons</td><td>For washing vehicles, watering plants, cleaning floor and other external uses.</td></tr>
<tr><td colspan="2"> 
Tank A: 400 gallons</td><td colspan="2"> 
Tank B: 400 gallons</td><td colspan="2"> 
Tank C: 400 gallons</td></tr>
<tr><td>13</td><td>Rainwater harvesting</td><td>International house</td><td>3</td><td>Tank A: 400 gallons
Tank B: 400 gallons
Tank C: 400 gallons</td><td>For washing vehicles, watering plants, cleaning floor and other external uses.</td></tr>
<tr><td colspan="2"> 
Tank A: 400 gallons</td><td colspan="2"> 
Tank B: 400 gallons</td><td colspan="2"> 
Tank C: 400 gallons</td></tr>
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14	Rair water harvesting	Bus depot	3	Tank A: 400 gallons Tank B: 400 gallons Tank C: 400 gallons	For washing vehicles, watering plants, cleaning floor and other external uses.
 Tank A: 400 gallons		 Tank B: 400 gallons		 Tank C: 400 gallons	
15	Rainwater harvesting	Landscaping nursery	2	Tank A: 400 gallons Tank B: 400 gallons	For washing vehicles, watering plants, cleaning floor and other external uses.
 Tank A: 400 gallons		 Tank B: 400 gallons			

16	Rain water harvesting	TADIKUM	1	Tank A: 200 gallons	For washing vehicles, watering plants, cleaning floor and other external uses.
*17	Rainwater harvesting	TASKUM	1	Tank A: 200 gallons	For washing vehicles, watering plants, cleaning floor and other external uses.
18	Rainwater harvesting	Kompleks Perdana Siswa	1	Tank A: 93 gallons	For washing vehicles, watering plants, cleaning floor and other external uses.
		 Tank A: 93 gallons			
19	Rainwater harvesting	Zero Waste Campaign	1	Tank A: 500 gallons	For washing vehicles, watering plants, cleaning floor and other external uses.
		 Tank A: 500 gallons			

20	Rair water harvesting	PALAPES training ground	1	Tank A: 2,400 gallons	For toilet flushing, washing vehicles, watering plants, cleaning floor and other external uses.
 Tank A: 2,400 gallons					
21	Rainwater harvesting (underground tank)	Bangunan Azman Hashim	1	Tank A: 5,468 gallons	For washing vehicles, watering plants, cleaning floor and other external uses.
 Tank A: 5,468 gallons					
22	Rainwater harvesting	Cancer Farm	1	Tank A: 400 gallons	For washing vehicles, watering plants, cleaning floor and other external uses.
 Tank A: 400 gallons					

23	Rair water harvesting	Botanical Garden	2	Tank A: 880 gallons Tank B: 880 gallons	For watering plants, washing vehicles, cleaning floor and other external uses.
 Tank A: 800 gallons & Tank B: 800 gallons					
24	Rain water harvesting (with treatment system)	Academy Islamic Studies	4	Tank A: 198.13 gallons Tank B: 198.13 gallons Tank C: 198.13 gallons Tank D: 198.13 gallons	For ablution (Muslim), washing vehicles, watering plants, cleaning floor and other external uses.
 Tank A: 198.13 gallons, Tank B: 198.13 gallons, Tank C: 198.13 gallons & Tank D: 198.13 gallons					

Updated: 9 Oct 2017

SUMMARY RAINWATER HARVERSTING SYSTEM:

Total tanks = 68 tanks
Volume (gallons) = 36,013.52 gallons
Locations = 24 locations

AWARENESS POSTER

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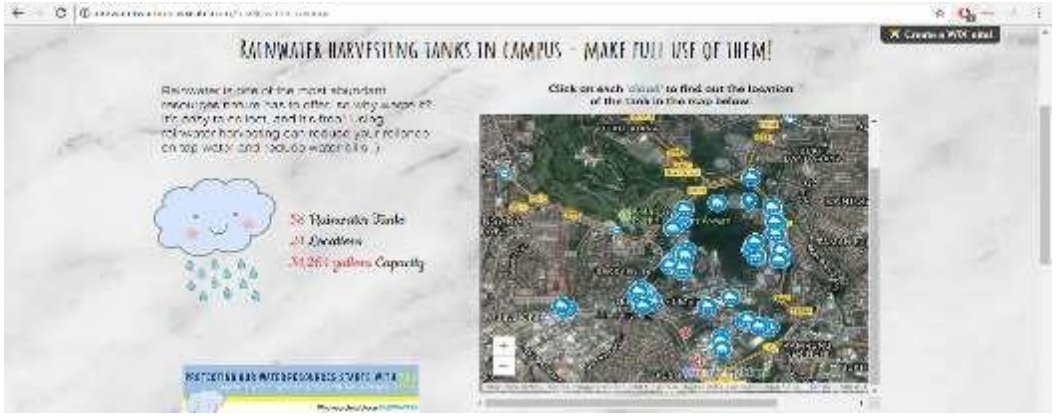
ONLINE RAINWATER HARVESTING MAPPING (*http://umwaterwarriors.wixsite.com/tasek/water-savings*)



IMPLEMENTED IN GROUND WATER TANKS

No.	Title Program	Program Brief	Evidence
1	Groundwater hand pump	In 1985, Prof. Goh Sing Yau and his team from the Faculty of Engineering, University of Malaya developed a high quality PVC plastic hand pump for use in the supply of water in rural areas of developing countries. He received the Tun Abdul Razak National Award for his excellent work. This hand pump at Tasek Varsiti has been use as showcase site to visitors and public until now.	
2	Groundwater as a water source for lake	One of the clean water source for the lake (Tasek Varsiti) is the groundwater. The tube well is about 100m deep and continuously sustaining water supply for the lake.	 
3	Educational site for groundwater studies	Department of Geology, Faculty of Science have a groundwater tube well for studying the quality and quantity of groundwater. It also an open classroom for students who are taking course: Hydrogeology.	 

IMPLEMENTED IN LAKES OR PONDS

No.	Date	Title Program	Program Brief	No. of participants	Evidence (Photos); 2 Photos each program
1	17 January 2017	Environmental Education with Homeschool Kids	Participants will act as citizen scientists and learn about water quality monitoring using a simple kit.	14	
2	20-21 April 2017	Symposium on Sustainable Development (SSD 2017): Educational Booth	Water Warriors was given the platform to showcase our research development and outputs during the symposium held in University of Malaya.	100+	
3	25 April 2017	Biological Indicator Study with Global Environment Centre @ Sungai Pantai & Rimba Ilmu, University of Malaya.	Water Warriors collaborated with Global Environment Centre (GEC) to conduct a simple biological survey on aquatic invertebrates at two location: Sungai Pantai (river) and Rimba Ilmu (stream) as part of Malaysia's River of Life programme.	6	

4	12 May 2017	Fish Population Study at Tasek Varsiti	A fish population survey was conducted at Tasek Varsiti, University of Malaya with Dr. Mohd Sayuti Ab Karim from Department of Mechanical Engineering using Deeper Smart Fishfinder.	5	
5	25 May 2017	Convention on Green Campus Sustainability @ Universiti Putra Malaysia: Educational Booth	Water Warriors was given the platform to share our educational materials and programmes to students and staffs from other universities and the general public.	100+	
6	31 May 2017	Water Quality Monitoring & Fish Study with Fisheries Biosecurity Division, Department of Fisheries Malaysia at Tasek Varsiti, University of Malaya	A research collaboration and sharing session with the Biosecurity Division, Department to investigate the health of the fishes in Tasek Varsiti, University of Malaya.	15	

					
7	8 July 2017	National Science Challenge by Academy of Sciences Malaysia: Educational Booth	Water Warriors was given the platform to share our educational materials and programmes to students from five different high schools during the National Science Challenge held at University of Malaya.	100	
8	31 July 2017	Citizen Science: Secchi Dip-In during Lakes Appreciation Month	Volunteers take readings of transparency at Tasek Varsiti, University of Malaya during the Dip-In dates (the whole month of July) and enter the data in Secchi Dip-In website. Transparency, usually using the Secchi disk, is the most common measurement.	5	
9	6 September 2017	Edutourism at Tasek Varsiti, University of Malaya: Utsunomiya University (Japan) & Faculty of Engineering (UM)	Participants learn about disaster management at the campus lake, participated in tree walk and water quality monitoring of the river and lake in campus.	20	

10	11 September 2017	LAKES workshop	Water Warriors collaborated with International Lake Environmental Committee (ILEC) to develop a database for research purposes.	10	
11	14 September 2017	Biological Sampling with Global Environment Centre (GEC)	Water Warriors collaborated with Global Environment Centre (GEC) to conduct a simple biological survey on aquatic invertebrates at two location: Sungai Pantai (river) and Rimba Ilmu (stream) as part of Malaysia's River of Life programme.	7	
12	30 September 2017	River Explorer @ World Rivers Day celebration	Water Warriors will collaborate with Global Environment Centre (GEC) to host River Explorer program at University of Malaya where participants will act as citizen scientists to conduct biological stream sampling and chemical water quality monitoring.	50	
13	2 October 2017	Edutourism at Tasek Varsiti, University of Malaya: Shibata High School (Japan)	Participants will act as citizen scientists and learn about water quality monitoring using a simple kit. Participants will test the water of the lake and river in University of Malaya.	43	

14	11 October 2017 (upcoming)	Edutourism at Tasek Varsiti, University of Malaya: Faculty of Built Environment, University of Malaya (UM)	Participants will participate in edutorurism program at Tasek Varsiti: guided tree walk and water quality monitoring.	24	Picture from last year's (2016) program with Faculty of Built Environment, UM: 

Water Conservation Programme: Water Refill Initiative - Indirect Impact to minimize the purchase of plastic bottled water in campus

No.	Title Program	Program Brief	Evidence
1	Water Refill Initiative	University of Malaya provided a variety of alternative options to purchasing commercial bottled water on campus. This effort aligns with University's goal to reduce the number of plastic water bottle waste gong to landfill and empower the campus community to be environmentally responsible. The refill water stations located around campus (more than 40 water stations); faculties, colleges. By choosing to refill your water, you can save money and also the environment.	Faculty of Education  Raja Dr. Nazrin Residential College 

			Botanical Garden 

Data Provider:
UM Living Lab (Water Warriors)
Department of Development & Estate Maintenance (JPPHB) UM

Data Verification:
Deputy Vice-Chancellor (Development) UM