जल शक्ति अभियान
संचय जल, बेहतर कल

Jal Shakti Campus and Jal Shakti Gram

A Water Conservation Action and Implementation Plan for Higher Education Institutions

उन्नत भारत अभियान
UNNAT BHARAT ABHIYAN

Mahatma Gandhi National Council of Rural Education

(Formerly National Council of Rural Institutes)

Department of Higher Education, Ministry of Human Resource Development, Government of India

सत्यमेव जयते

विश्वं पुष्टं ग्रामे अस्मिन् अनातुरम्
MGNCRE
Where there is Rural Wellbeing there is Universal Prosperity

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A Water Conservation Action and Implementation Plan for Jal Shakti Campus and Jal Shakti Gram Initiatives promoted by Higher Education Institutions

Strategies Proposed for Bringing Water Sustainability to Villages and Campuses of Indian Higher Education Institutions

August 2019

A Project of the Higher Education Department
Ministry of Human Resource Development
Government of India

This manual on Jal Shakti Campus and Jal Shakti Village - An Action and Implementation Plan for Higher Education Institutions for development of a Water Conservation Plan has been published by Mahatma Gandhi National Council of Rural Education (MGNCRE) Hyderabad.

It is intended to help Higher Education Institutions including Universities, Colleges and Polytechnics in developing strategies, action plans and implementation plans for water conservation on the campuses and in the villages with which the campuses are engaged with. The manual is a how to guide on water management measures including conservation measures such as water budgeting, water metering, water audit, water demand study, reduction in water losses and management of demand and supply of water in a campus and the villages with which the Higher Education Institutions are engaged with in National Service Scheme (NSS), Swachhta Action Plan (SAP) and Unnat Bharat Abhiyan (UBA).

For questions or comments: Email admin@mgncre.in

About the Manual

Standard Operating Procedures can fix responsibility on the persons and stress on the processes of water conservation. Campuses of educational institutions have different and difficult types of water management – at health centres, buildings, kitchens, laboratories, office, lawns, and hostels. Campus is a mini community where educational institutions impart learning. Practices can inculcate habits as a duty on the campuses of educational institutions. Habit formation is possible through experience and practice. This SOP is for supporting the task of promoting water conservation on the campus, its neighbourhood village communities they are engaged with as part of various community engagement programmes: Swachhta Action Plan, Unnat Bharat Abhiyan and National Service Scheme. Water supply systems require continuous monitoring and practice of ever improving processes. This manual, encompassing Standard Operating Procedures, is designed for easy adoption and successful adaptation by universities and the Higher Education Institutions (HEIs) across India, to suit individual institutional and community conditions.

The objective is to develop a model water conservation plan containing effective short- and long-term water conservation procedures and practices reflecting local water resource needs and water quality as well as quantity. This manual serves as an aid for water conservation techniques and practices. There is a delicate balance between water supply and demand. Increased water demand and contamination of supplies have placed more stress on existing water resources. This manual describes processes, procedures, steps, methods and provides ways for devising a beneficial water conservation plan on the campus and the villages as well as neighbourhood communities with whom they are engaged with considering various demand areas and processes.

I sincerely hope that 'Day Zero' (a situation when the municipalities and local self government institutions are not forced to shut off the water supply systems and strictly ration water supply for public and industrial use) will not arrive. Jal Shakti Abhiyan – Water Conservation Initiative will build community participation not only for the present but also for the future. The key interventions are water budgeting, water measurement, water consumption monitoring, conservation and rainwater harvesting, renovation of traditional and other water bodies/tanks, reuse and recharge structures, watershed development and intensive afforestation.

We sincerely thank Shri VLVSS Subba Rao for envisioning the manual and taking it forward to its logical goal. MGNCRE Team members – Dr. K N Rekha, Dr. Ravi Prakash Singh, Mr. A N Reddy, Ms Vani Jagadishwari, Sivaram G and Ms Anasuya V for providing inputs to this manual.

Dr. W G Prasanna Kumar
Chairman MGNCRE

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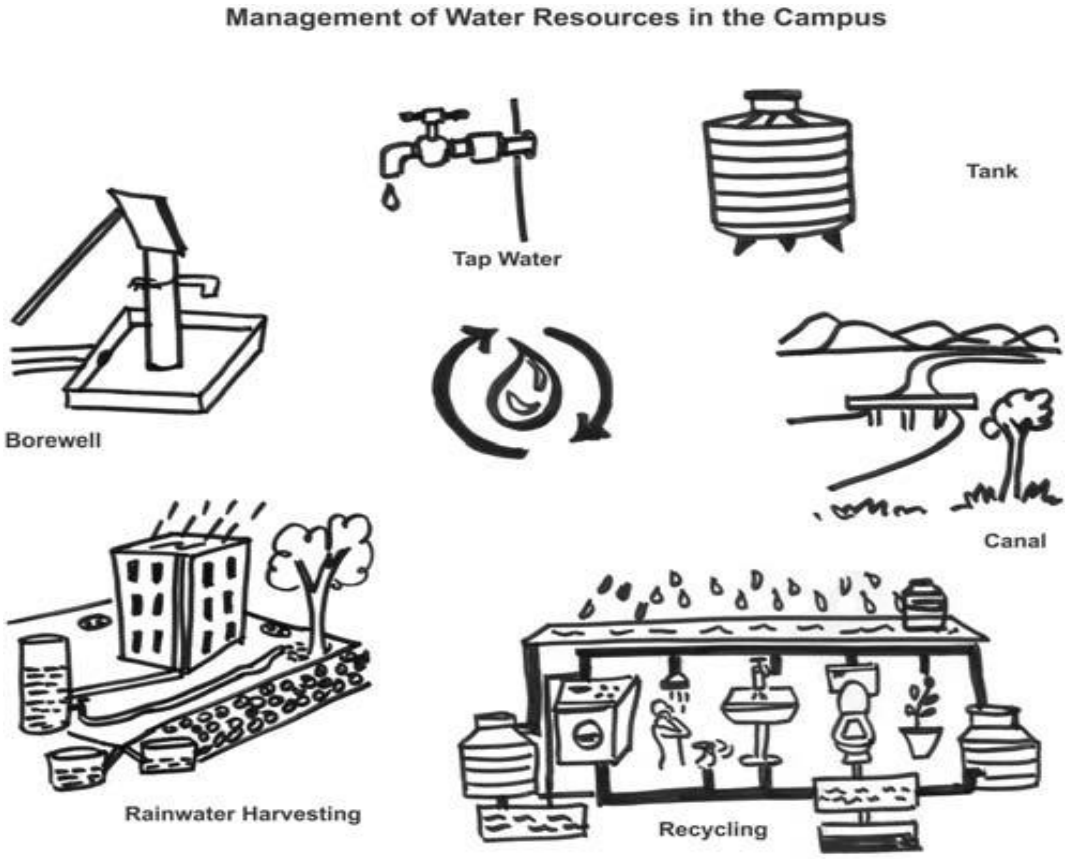
Introduction

Higher education institutions (HEIs) enjoy tremendous autonomy in terms of managing their natural resources. They are virtually independent and are internally regulated, while civilians, businesses, industries and others are subjected to, with close external monitoring and accountability. This opportunity of self regulation available to them with their own heads of universities presiding over their internal resource management system as the final authority can be the springboard to water conservation. Water conservation needs to be ingrained in not only the consciousness but also practices of every citizen and system. HEIs have to make unremitting efforts through faculty, staff and students to make the Jal Shakti Abhiyan successful. Key Water challenges include Water Conservation, Water Quality Management, Watershed Management, Storm water Management and Wastewater Management.



Role of Higher Education Institutions in Water Conservation

- Build consensus on the need for water conservation on campus with students, administration, faculty and other internal as well as external stakeholders
- Build consensus on the need for water conservation on campus with village residents, village administration, gram sabha and other internal as well as external stakeholder institutions like schools, self help groups, health centres, village banks, panchayats
- Facilitate design of specific interventions for making the campus water sufficient and water efficient by following best available standards and accepted parameters
- Facilitate design of specific interventions for making the village water sufficient and water efficient by following best available standards and accepted parameters
- Monitor the existing water management in the campus with participation and transparency
- Monitor the existing water management in the village with participation and transparency
- Present a step-by-step guide for conserving water on the campus
- Present a step-by-step guide for conserving water on the village
- Generate case studies on best water conservation practices adopted on the campus and in the villages the campuses are engaged with. These instances can serve as models for other institutions and villages to adopt
- A core team consisting of the leadership of the institution along with key stakeholders may be formed. The team shall work as " Campus Jal Shakti Team".
- A core team consisting of the leadership of the village along with key stakeholders may be formed. The team shall work as "Village Jal Shakti Team".
- The team that would be involved in all aspects of exploring, surveying, fact-finding, recording, planning, taking action and monitoring will also include all relevant stakeholders viz., citizens, student teams, their teachers, village leaders apart from administrative officials concerned in both campuses and villages.
- One or two interested or environmentally-concerned-inclined faculty members or village community leaders may be given the responsibility to lead the water conservation movement in the respective realms. This team, henceforth named the 'Jal Shakti Leadership Team' will select a group of enthusiastic students starting from their own departments to be part of the core campaign team, hereinafter called 'Jal Shakti Student Team'.
- Together Jal Shakti Leadership Team and Jal Shakti Student Team is a Jal Shakti Team.

- The Jal Shakti Team will report to a team of campus officials representing accounts, administration and maintenance divisions, with an avid interest in the water conservation initiatives: Jal Shakti Admin Group.
- The entire programme will run under direction from the designated authority that will set the policies, rules and directives for bringing change.
- Jal Shakti Team External Members for Water Conservation need to be identified from neighbouring Universities/HEIs/Colleges. They will support in monitoring the progress at regular intervals
- Water Conservation Initiative can be a successful only if the Head of the Institution ignites the spirit of everybody in the organization. S/he needs to direct the departments, pay attention to the findings of student teams and ensure that their valuable suggestions are followed in letter and spirit by all students, faculty members as well as administrative, non-teaching and support staff. A motivated leader can bring a sea-change in the system and therefore s/he is the cornerstone of this campaign. An advisory committee may be constituted to guide the initiative.

Parameters for Campus Score in Water Conservation

Physical Appearance and Overall Ambience

Water Conservation

- Adequacy of Water
- Plumbing adequacy of water taps and Sanitary fixtures
- Water Efficient Toilets
- Dedicated Staff for Water Maintenance
- Dedicated Staff for Water Inspection
- Periodic mending and repairs of leaks in taps and pipes
- Two levels of flushing in all the toilets
- Planting indigenous variety of plants and less water requiring plants
- Organising water conservation workshops to the faculty and students on the campus

Rainwater Harvesting

- Installation of rain gauge and rain recording system
- Steps taken for implementing rainwater harvesting inside the campus
- Digging rainwater harvesting pits on the campus
- Educating on Water Harvesting through workshops/seminars

Renovation of Traditional and other Water Bodies/Tanks

- Groundwater recharge
- Maintenance of water balance
- Reuse and recharge structures
- Watershed development
- Land management
- Water management
- Biomass management

Other Interventions

- Technological and sociological interventions
- Planning, Preparing and Reporting Mechanism
- Appropriate display, publicity, sharing knowledge
- Treating personnel/workers with respect and looking into their welfare
- Adhering to Reporting Mechanisms
- Designated Officer Monitoring and taking Corrective measures for Water Management

HEIs- Campus Tasks in Water Conservation

- **Every Higher Education Institution needs to prepare a water budget:**
  a. Each building and each open tract of land (based on the gradient of Land) in every HEI Campus is to be considered as a HEI Campus unit for preparing water budget
  b. Each of them provides challenges and opportunities for water conservation
  c. Every HEI Campus unit needs to develop its short term water requirements, consumption, conservation targets: day wise, month wise, quarterly (seasonal) and annual for each area (at least for each building and each open tract of land) in the campus
  d. Every HEI Campus unit needs to have its own rain gauge and its own rain recording system.
  e. Every HEI Campus unit needs to explore the feasibility for designing contour trenches, artificial ponds and roof top water harvesting structures as per the local capacity, terrain, gradient of land, soil porosity and rainfall.
  f. Every HEI Campus unit needs to construct rainwater harvesting structures in the campus as per the appropriate designs made

- **Water Quantity and Quality monitoring and annual targets on identified indicators of**
  a. Every Higher Educational Institution shall designate its various sources of water for various uses in its campus basing on the quality and recyclability.
  b. Regulate use of ground and surface water (use best quality of water for best use and lower quality of water for cleaning and washing as well as flushing)
  c. Every HEI Campus unit in every higher educational institution shall install appropriate Rainwater harvesting structures in identified locations in the campus (form the total campus into manageable zones based on the terrain and gravity)

- **What is measured gets monitored. What is monitored gets managed.**
  a. Install water use meters and flow meters at all bulk water dispensing locations and tanks.
  b. Keep the ground water drawn metered and monitored

- **Monitor overhead tanks**
  a. Monitor the overhead tanks noting the difference in levels of water in the overhead tank at designated time every day.
  b. Ensure that the tanks are full as each day begins. Note the difference in levels of water for estimating the consumption of the day.

- **Motor metering method**
  a. Per minute pump wise flow of water or water output is to be measured and the time or number of hours and minutes the water pump is switched on is to be measured and water output is to be calculated.
  b. Every time the motor runs, this is counted and added to estimate the withdrawal of water.
  c. Conduct this water audit followed by the preparation of water budget for the campus.

- **Estimate the source of the campus water-**
  a. Identify the sources of the campus water and the capacity of yield from each source
  b. Identify various uses of water in every campus
  c. Measure and monitor water table on the campus and the seasonal variations, especially in bulk consumption locations

- **Start water conservation**
  a. Identify bulk consumption locations as well as non-bulk consumption locations and provide unique number for each location
  b. Develop an alert system for informing the leakages in each of the location by identifying them through the unique number
  c. Mend the leaks in taps and pipes periodically(daily/weekly/fortnightly/monthly) focusing more intensive approach for bulk consumption locations.
  d. Work on the toilet flushes and the optimum water use from the flush by installing two levels of flushing.

- **Manage water**
  a. Introduce less-water-intensive gardens and lawns
  b. Replace the present water intensive gardens and lawns immediately

- **Introduce Recycling**
  a. Identify water recycling opportunities on the campus basing on the bulk water usage and dispensation points
  b. Introduce first-in first-out method for retaining the quality of drinking water.
  c. Introduce counter current method of using Best Quality Water for Best Use Viz., drinking, bathing, gardening, and cleaning.

- **Plugging leakages**
  a. Form an area-wise water watching team which stops the water wastage.
  b. Adopt a method of geo tagging the water leaking points and app-based alerts of the plumbers in the campus to arrest water leakages and water stagnation-related challenges.

- **Plantation**
  a. Avoid planting ornamental roadside trees, monoculture and China grass lawns.

b. Select local species that are resilient, fruit-bearing, useful shall be planted in place of present irrigation intensive plants
c. Plants like lantana and other exotic species need to be avoided.

- **Administration**
  a. Form Campus Student Teams
  b. Involve Engineering Wing, Administration Wing, Planning Wing and Horticulture Wing of the University Department to handle water related works.

Table 1: Master Chart for Assessing whether the Campus is Water Smart

S No	Criteria	Yes	No
1	**Water Budget**		
	a. Has your Campus prepared water budget for short term, day wise, week wise, month wise, and quarterly (seasonal) water budget		
	b. Do you have rain gauge and rain recording system at various locations on the campus?		
	c. Have you constructed rainwater harvesting structure for each Campus Unit Area on the Campus?		
	d Did you design and install contour trenches as per the local capacity, terrain, gradient of land, soil porosity and rainfall?		
	e. Did you design and install artificial ponds as per the local capacity, terrain, gradient of land, soil porosity and rainfall?		
	f. Did you design and install roof top water harvesting structures as per the local capacity, terrain, gradient of land, soil porosity and rainfall?		
2	**Water Quantity and Quality Monitoring**		
	a. Did you designate its various sources of water for various uses in its campus basing on the quality and recyclability?		
	b. Do you regulate use of ground and surface water (use best quality of water for best use and lower quality of water for cleaning and washing as well as flushing)?		

	c. Did you carry out rainwater harvesting in identified locations (forming the total campus into manageable zones based on the terrain and gravity)?		
3	**Monitoring and Management**		
	a. Did you install water use meters and flow meters at all bulk water dispensing locations and tanks?		
	b. Do you keep the ground water drawn metered and monitored?		
	c.Do you conduct the water audit followed by the preparation of water budget for the campus?		
4	**Monitor Overhead Tanks**		
	a. Do you monitor the difference in levels of water in the overhead tank from the beginning of every day?		
	b. Do you ensure that the tanks are full at the beginning of each day?		
	c. Do you note the difference in levels of water for estimating the consumption of the day?		
5	**Motor Metering Method**		
	a. Do you measure per minute pump-wise flow of water?		
	b. Do you monitor number of hours the water pump is switched on?		
	c. Do you calculate water output?		
	d. Do you measure the flow of water every time the motor runs to estimate withdrawal of water? e. Do you have an ongoing program to monitor, check, repair, and replace meters?		
6	**Estimation of Water Yield Capacity from all Sources of the Campus Water**		
	a. Have you identified the sources of the campus water and the capacity of yield from each source?		
	b. Have you identified various uses of water in every campus unit?		
	c. Do you measure and monitor water table on the campus and the seasonal variations in it?		
7	**Start Water Conservation**		
	a. Do you take steps in mending the leaks in taps and pipes with a designated frequency?		
	b. Do you have two levels of flushing for optimum water use introduced in all toilets?		
8	**Manage Water**		
	a. Do you have less-water-intensive gardens and lawns?		
	b. Are you willing to replace the present water intensive gardens and lawns immediately?		

9	**Introduce Recycling**		
	a. Do you have water recycling opportunities on the campus basing on the bulk water usage and dispensation points?		
	b. Do you practice first-in first-out method for retaining the quality of drinking water?		
	c. Do you practice counter current method of using Best Quality Water for Best Use Viz., drinking, bathing, gardening, and cleaning?		
10	**Plugging Leakages**		
	a. Do you have campus unit wise (area-wise) water watching team which stops the water wastage?		
	b. Do you adopt a method of geo tagging the water leaking points and app-based alerts of the plumbers on the campus to arrest water leakages and water stagnation-related challenges?		
11	**Plantation**		
	a. Have you planted ornamental roadside trees, monoculture and China grass lawns?		
	b. Are you willing to replace or plant select local species that are resilient, fruit-bearing, useful plants in place of present irrigation intensive plants?		
	c. Will you avoid planting lantana and other exotic species?		
12	**Administration**		
	a. Did you form Campus Jal Shakti Student Teams?		
	b. Did you Involve Engineering Wing, Administration Wing, Planning Wing and Horticulture Wing of the University Department to handle water related works?		

Result: **Water Smart** – **75% Yes - compliant**

Table 2: Assessing Campus Score in Water Conservation

2.1 Water Budget (source wise and bulk usage location wise)													
S No	**Criteria**	**Day Wise (in 000s litres)**			**Week Wise (in 000s litres)**			**Month Wise (in 000s litres)**			**Quarterly(in 000s litres)**		
	Water												
		Source 1	**Source 2**	**Source 3**	**Source 1**	**Source 2**	**Source 3**	**Source 1**	**Source 2**	**Source 3**	**Source 1**	**Source 2**	**Source 3**
1.	Water Availability												
2.	Usage of Water												
3.	Water Quality												
4.	Rainwater Harvesting												
5.	Recycling												
6.	Campus Initiatives												
Estimation of Yield of water from each Source of Water (1 point)													
		Day Wise (in litres)			**Week Wise (in litres)**			**Month Wise (in litres)**			**Quarterly (in litres)**		
	Source	**Source 1**	**Source 2**	**Source 3**	**Source 1**	**Source 2**	**Source 3**	**Source 1**	**Source 2**	**Source 3**	**Source 1**	**Source 2**	**Source 3**
Water Requirement													
	Estimated Water Requirement	**Day Wise (in litres)**			**Week Wise (in litres)**			**Month Wise (in litres)**			**Quarterly (in litres)**		
		Source 1	**Source 2**	**Source 3**	**Source 1**	**Source 2**	**Source 3**	**Source 1**	**Source 2**	**Source 3**	**Source 1**	**Source 2**	**Source 3**
1.	Drinking												
2.	Bathing												
3.	Washing												
4.	Flushing												
5.	Other uses												

Availability of Water (Surplus/Deficit)													
	Purpose of water available for usage post consumption (expressed in %)	**Day Wise (in litres)**			**Week Wise (in litres)**			**Month Wise (in litres)**			**Quarterly (in litres)**		
		Source 1	**Source 2**	**Source 3**	**Source 1**	**Source 2**	**Source 3**	**Source 1**	**Source 2**	**Source 3**	**Source 1**	**Source 2**	**Source 3**
1.	Drinking												
2.	Bathing												
3.	Washing												
4.	Flushing												
5.	Other uses												

Consumption (Excess/Deficit)													
	Percentage of Water Drawn in excess/ need to be supplemented	**Day Wise (in litres)**			**Week Wise (in litres)**			**Month Wise (in litres)**			**Quarterly (in litres)**		
		Source 1	**Source 2**	**Source 3**	**Source 1**	**Source 2**	**Source 3**	**Source 1**	**Source 2**	**Source 3**	**Source 1**	**Source 2**	**Source 3**
1.	Drinking												
2.	Washing												
3.	Flushing												
4.	Cleaning												
5.	Gardening												
6.	Other uses												

Source 1: Pipeline through municipality/corporation/ PWDs/ gram panchayats
Source 2: Well, borewell and tube well on the campus
Source 3: Waterfall, stream, canal (independent sources)

Usage of water

Usage of water depends on availability, habits and the quality of water dispensing systems like taps, storage points and pipelines
a. Actual water consumption – Ideal water consumption = A (quantity of excess water consumed)
b. A/Ideal quantity of water consumption X100x0.10 = X
c. Points scored for quantity of water consumed = 20-X

Water Consumption

If the consumption of your institution is less than 30 LPCD (Day scholar),100 (hosteller) and 135 LPCD resident your institution gets 10 points, a. deduct 0.9. for every liter consumed over 30 LPCD (Day Resident), b. deducts 0.9. for every liter consumed over 100 LPCD (hosteller)

and c. deduct 0.9. for every liter consumed over 135 LPCD (Resident)

Excess Water= Water Usage-Water Consumption

Percentage of Water Drawn

Source 1: Pipeline through municipality/corporation/ PWDs/ gram panchayats
Source 2: Well, borewell and tube well on the campus
Source 3: Waterfall, stream, canal (independent sources)

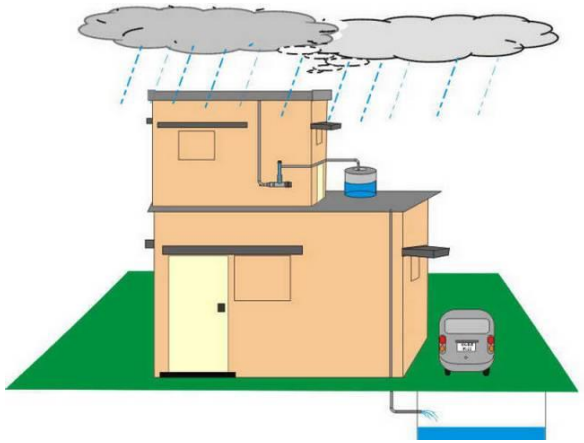
Ask administrative staff for water bills which contain the quantity of water drawn from a particular source.
Calculate the percentage of water drawn from a particular source for a specific purpose (drinking, flushing) apply the formula given below.
For other Sources find out the receptor storage space capacities and multiply by the number of times they are filled per day.

$$\frac{\text{Quantity of water drawn from a particular source}}{\text{Total quantity of water used for a specific purpose}} \times 100$$

2. 2 Water Quantity and Quality Monitoring (20 points)			
S No	**Criteria**	**Max Points**	**Scored**
	Water Quality	**10**	
1.	Is the clean drinking water supplied periodically?		
2.	Are the sumps filled every day?		
3.	Are there the sumps cleaned every month?		
4.	Are the sumps chlorinated every day?		
5.	Are chloroscopes available for testing water quality in every building?		
6.	Are the chloroscopes maintained with required calibration? (1point)		
7.	Are chloroscopes utilized for testing water quality in every building? (1point)		
8.	Are the chloroscopes used giving effective readings?		
9.	Is the RO water provided in every building? (1 point)		

10.	Is the RO water supplied consistently everyday through refills? (1point)		
	Total		
	Water Quality Monitoring		
11.	Is the water filter/ R.O machine in good working condition?		
12.	Is it maintained under AMC?		
13.	If water is supplied by a private agency, is it tested OK?		
14.	If water filters are absent, is drinking water boiled before serving?		
15.	Is the filter leaking/ in rusty condition?	**10**	
16.	Is drinking water available 24/7?		
17.	Is the area around the inlet and drinking water point clean and dry?		
18.	Is there safe, clean water available for cooking and cleaning?		
19.	If water supply is intermittent, is there a water storage tank provided for the kitchen?		
20.	Is the tank cleaned regularly?		
	Total		

Rainwater Harvesting on the Campus



Rainwater is the main water from natural source. Every campus can harvest water depending upon the area on the campus. This could be both paved area and unpaved area. For the purpose of location specific groundwater recharge and for harvesting efficiency, paved water catches and provides higher quantity of water. Rainwater is also universal carrier of waste on its route. It is essential to keep the rainwater route clean to ensure free flow of clean water and better recharge of rainwater. For this, the following calculations and data are required.

a. Area of the Campus Land:
b. Institution's Paved Area:
c. Institution's Unpaved Area:

Annual Rainfall in Metres (Rainfall in MM/1000) = Area of the Institution's Land x Annual rainfall in metres

Rainwater that can be harvested in an area can be arrived at by the following calculations:

i. Paved area x Volume of Rainfall X 0.85(run off coefficient) +

ii. Unpaved area x Volume of rainfall x Runoff coefficient (Runoff coefficient for unpaved area = 0.35)

X. Rainwater that can be harvested: Quantity of rainwater harvested is: i + ii =_____ (Litres per annum).

Y. Rainwater Harvested: a + b

a. Unpaved area where rain water flow is channeled to the campus rainwater harvest point

Rainwater harvested in unpaved area

----------x 100 x 0.35*

Rainwater available for harvesting in unpaved area

b. Paved area where rain water flow is channeled to the campus rain water harvest point

Rainwater harvested in paved area

----------x 100 x 0.85*

Rainwater available for harvesting in paved area

Scoring of points scored for rainwater harvesting = Y/X x30

2.3 Monitoring and Management (13 points)			
S No	**Criteria**	**Max Points**	**Scored**
1.	Have you installed water use meters at all bulk water dispensing locations and tanks?	13	
2.	Do you monitor the water use meter every day?		
3.	Have you installed flow meters at all bulk water dispensing locations and tanks?		
4.	Do you measure the amount of ground water drawn on a daily basis?		
5.	Do you measure per minute pump-wise flow of water?		
6.	Do you monitor number of hours the water pump is switched on?		
7.	Do you measure the flow of water every time the motor runs to understand withdrawal of water?		
8.	Do you conduct water audit every day?		
9.	Do your prepare water budget?		
10.	Do you monitor the difference in levels of water in the overhead tank beginning of the day?		
11.	Do you check the difference in levels of water in the overhead tank when teaching and learning activity ends during the day?		
12.	Do you ensure that the tanks are full beginning of each day?		
13.	Do you estimate the consumption of water by end of the day?		
	Total		

2.4 Water Conservation (20 points)			
S No	**Criteria**	**Max Points**	**Scored**
	Functional taps without leakage in the toilets and campus	**5**	
1.	Availability of functional taps (all points of use) on the campus toilets and bath areas (students, faculty, visitors)		
2.	Availability of functional taps excluding toilets and bath areas on the campus (students, faculty, visitors) – kitchens, gardens, public areas		
3.	Are leaking taps reported immediately? Frequency of taps replacement		
4.	Investing on good quality taps (rust-proof, PVC). Tap Inspectors – frequency of visits		
5.	Do pipe leakages get immediate attention?		
	Network of water pipelines – observe for leakages	**2**	
6.	Weekly checking of water pipelines for leaks		
7.	Hygiene maintenance in water pipeline areas		
	Leakages impacting roofs and sidewalls	**3**	
8.	Identification of leaking points on roofs and sidewalls		
9.	Experts/Engineers' Inspection and advice on impact of leaking roofs and sidewalls		
10.	Weekly repairs/ maintenance of leaking roofs & sidewalls		
	Feedback mechanism	**3**	
11.	Availability of feedback mechanism in all campus buildings for review		
12.	Periodic review of leaking taps, and plumbing fixtures from students, faculty and campus residents		
13.	Assessing and implementing the complaints/suggestions received from students, faculty and campus residents		
	Water Efficient Toilets		
	Toilets equipped with dual flush system	**4**	
14.	Flush tank has dual flush and efficient less than 6 ltrs		
15.	Flush tank has dual flush but inefficient more than 6 ltrs		
16.	Flush tank has single flush and efficient less than 6 ltrs		
17.	Flush tank has single flush but inefficient more than 6 ltrs		
	Taps – sensor based or time	**2**	
18.	Timed efficiently		

19.	Timed not so efficiently		
	Availability of Recycled Water for Toilets		
20.	Recycled water is available and has connected network	**1**	

2.5 Quality of Drinking Water (9 points)			
S No	**Criteria**	**Max Points**	**Scored**
1.	**Availability of clean drinking water**		
2.	Is the water filter/ R.O machine in good working condition?		
3.	Is it maintained under AMC?		
4.	If water is supplied by a private agency, is it tested OK?		
5.	If water filters are absent, is drinking water boiled before serving?		
6.	Are clean water tumblers provided?		
7.	Is the filter leaking/ in rusty condition?		
8.	Is drinking water available 24/7?		
9.	Is the area around the inlet and drinking water point clean and dry?		
	Total		

2.6 Recycling (30 points)			
1.	Is Sampling and analysis of Waste Water done?		
2.	Is there a plan for recycling waste water on the campus?		
3.	Is there a method for collection of used water for recycling?		
4.	Is gray water or non-recycled water used for any purpose?		
5.	Is recycled water used in all blocks of the campus?		
6.	Is the recycling equipment well maintained?		
7.	Is the waste water collected daily, weekly, monthly, annually?		

8.	Is the collected waste water recycled daily, weekly, monthly, annually?		
9.	What is the percentage of waste water recycled?		
10.	Is the wastewater from R O Plants diverted for any purpose?		

2.7 Plantation (15 points)			
S No	**Criteria**	**Max Points**	**Scored**
1.	Area under green cover	5	
2.	Campus Nursery Management		
3.	Plant Protection Management		
	Total		
	Total land area occupied (3 points)		
	Land Area	**Area in Square metres**	
1.	Constructed area		
2.	Green area* inside the boundary		
3.	Unconstructed barren area of others		
	Total land area		
	Nursery Management		
	Campus Initiatives (4 points)	**Max Points**	**Scored**
1.	Allocation of designated land area/place for plantation	4	
2.	Maintenance of nursery with shade and water		
3.	Nursery staffed		
4.	Nursery strategy for campus and community plantation		
	Total		
	Plant Protection and Plantation Management (5 points)		
1.	Plantation Monitoring	5	

	Planting less water intensive plants (2 points) Planting less water intensive lawns (2 points)		
2.	Plant support with bio fertilizers and water support		
3.	Replacement plan for plantation		
4.	Controlled Bio pesticide administration		
5.	Locational Drip support		
	Total		

* Green area includes any area which has grass cover, tree cover and horticulture. The total area is ---------- square metres. Percentage of green area is:

$$\text{The percentage of green area} = \frac{\text{Total green area in square metres}}{\text{Total area in square metres}} \times 100 \times 0.66$$

Our campus grounds provide excellent learning opportunities on plant and animal resources and the natural world around you on the campus map. Proper land use can transform our campus area into biologically diverse outdoor classrooms and healthy open spaces. Green area in the campus reduces air pollution and helps thriving diverse local species of plants and animals. We need to measure the green area in the campus. To monitor the green area, we need to manage the green area on the campus.

The following are the steps: Calculate the percentage of green area on the campus.

The following are the steps:

Calculate the percentage of green area on the campus.

33% Area under Green Cover 66 Points @ 2 points per 1% of Green Cover

2.8 Administration (20 points)			
S No	**Criteria**	**Max Points**	**Scored**
	Dedicated Staff for Water Maintenance	**4**	
1.	Availability of adequate staff - men and women for maintenance Is any teaching/admin faculty specifically allotted the task of monitoring all water issues?		
2.	Is sufficient number of cleaning staff available? If required enquire about working conditions from a few staff members to ascertain workload and training)		
3.	Is there job rotation for maintenance staff?		
4.	Is the staff motivated to maintaining a water smart campus?		
	Plugging Leakages	2	
1.	Do you have area-wise water watching team which stops the water wastage?		
2.	Do you adopt a method of geo tagging the water leaking points and app-based alerts of the plumbers on the campus to arrest water leakages and water stagnation-related challenges?		
	Training provided	**2**	
1.	Is staff provided with sufficient training and equipment to conduct their duties satisfactorily?		
2.	Is the training holistic, covering all the tasks on campus?		
	Random verification of reports by senior staff	**1**	
	Does the senior staff conduct random checks to ensure smooth running of maintenance operations?		
	Reporting of inadequate facilities and mechanism for repairs	**5**	
1.	Is there a suggestion mechanism in place: eg suggestion box/ complaint register/ intranet group?		
2.	Is this checked daily/weekly?		
3.	Is there a complaint redressal team for Hygiene maintenance issues?		
4.	Are staff's complaints also redressed through the same mechanism?		
5.	Are suggestions given by maintenance staff considered for improvement of Maintenance Cycle?		
	Formats for daily / weekly / monthly inspections and reports	**6**	
1.	Are inspection records maintained diligently?		
2.	Are the random inspection done by seniors judiciously?		
3.	Are the formats easy to fill, and comprehensive?		
4.	Is there a scope for adding notes in the report?		
5.	Do reports include suggestions and complaints received by users?		
6.	Does the senior staff conduct random checks to ensure smooth running of maintenance operations?		
	Total	**20**	

Monitoring and Management

This process basically involves monitoring the water storage and supply spaces and their management.

Importance of Water Meters

- Information from water meters helps to identify quantity of water drawn
- The size and type of meter needs to be appropriate for the range and rate of water use.
- Meters provide water accountability
- Meters help in knowing the results of a conservation effort
- Billing cannot be based on volumes of water used without meters
- Meters help influence water use
- Efficient meters help in pointing out the extent of water use and thus we can identify and calculate the excess use. It will support in repairing leaks, plumbing, and installing more efficient water-using fixtures.
- Meters are necessary for efficiently maintaining water systems, assessing demand, and determining expenditures.
- Maintenance of water meters is necessary for carrying out the required functions.
- With mud, sand and minerals passing through the meters, the measuring elements increase/decrease the tolerance in the chamber.
- A regular program of meter testing and maintenance needs to be done
- An appropriate meter record data with history cards will help in providing information on meter size, make, type, date of purchase, location, and tests and repairs.

The goal of water metering is to provide an accurate measurement and record of water use, and promote water conservation

Format 1: Sample Meter History Record Form

Sample Meter History Record Form				
A: Meter Information				
Mfr. No.	**Co. No.**	**Make**	**Size**	
Date Purchased	**Cost**	**Style**		
B. Installation Record				
Installed				**Removed**

Date	Reading	Name	Address	Tap No.	Reason	Date	Reading

C. Test and Repair Record

Date	Rate of Test			% Accuracy		Repair Cost		Tested by	Remarks	
	Min Flow	Inter Flow	Max Flow	Before Repair	After Repair	Materials	Lab or			

Recommended Actions

- 100% percent metering of all water system connections
- Regular program of testing, recalibrating, repairing or replacing meters as needed.
- Quarterly meter reading and prompt billing

Format 2: Questionnaire on Water Metering

1. What percent of campus water system is metered?_____%

2. Number of working meters in the campus water system:_____

3. List percentage of meters by category:
   a. Residential Blocks (Hostels, residential) ---------%
   b. Academic Blocks ---------%
   c. Garden/landscape/nursery ---------%
   d. Pantry/Kitchen ---------%
   e. Commercial (Market, Offices on campus) ---------%
   f. Other ---------%

4. How often are meters calibrated? Never, Monthly, Quarterly, Half Yearly, Annually

5. How often are the meters read? Never, Monthly, Quarterly, Half Yearly, Annually

6. What is the general condition of the meters? Very Good, Good, Bad_____

7. Do you have an ongoing program to monitor, check, repair, and replace meters?

   ___YES__NO

   What is the program?

   _____
   _____
   _____
   _____

8. Has the meter repair and calibration program on campus been effective in reducing the amount of unaccounted-for water, increasing revenues, or decreasing demand?
   Explain briefly:

_____
_____
_____
_____

9. Are there any problems in preventing the accomplishment of an optimal metering program? Explain briefly:

_____
_____
_____
_____

10. What is the estimated annual expenditure on metering?

Meter installation	Rs._____	Meter	repair	and
calibration	Rs._____			
Meter reading	Rs._____			

11. What are the scope and goals for improving the metering program?

_____
_____
_____
_____

12. What are the measures and timelines to implement and achieve the goals?

_____
_____
_____
_____

13. What is the approximate cost and funding source for these efforts?

Estimation of Source of the Campus Water

Water Supply Audit

- Water audit helps in assessing the demand, supply and wastage of water.
- The audit helps in determining how much unaccounted-for water is the leakage, what portion is due to meter under-registration, and other needed areas of improvement.
- The audit helps assess whether a particular system meets certain arbitrary rules and whether that system is utilizing reasonable, cost effective methods to reduce wastage of water
- The water supply audit is an indispensable step in making those determinations and setting priorities.
- The steps of a water audit include:
    - identifying and quantifying all water sources and all metered uses
    - identifying and estimating authorized unmetered uses
    - identifying and estimating water losses by types
    - analyzing audit results
- There needs to be a consistency in terms of audit period and water units measured.
- The audit results will help in forecasting water demand and conducting a leak detection and repair program.
- The campus needs to have a current list of all water sources supplying to the distribution points, including interconnections with other sources.
- Source locations/connections need to be illustrated on a map systematically.
- Each source or interconnection needs to have a way of measuring quantities supplied to the distribution points.
- For each source, the following needs to be recorded:

Table 3 : Water Source Information

✓ Name of source ✓ Type of source (well, reservoir, natural surface water body, purchased) ✓ Type of measuring device ✓ Date of installation ✓ Frequency of reading ✓ Frequency of testing ✓ Date of latest calibration		

- Each storage tank/storage reservoir needs to be measured at the beginning and the end of the audit period.
- If total storage has increased, that difference needs to be subtracted from the annual supply total.
- If total storage has decreased in total storage, it needs to be added to the total supply.
- These figures represent the difference between water delivered from sources and water entering the distribution system.

The following formula can be used to determine the total storage adjustment:
For each storage tank or reservoir:

Beginning Volume - Ending Volume = Change in Volume

The sum of the Changes in Volume = the Total Storage

Any other known additions or losses to the total supply can be adjusted accordingly.

Format 3: Water Supply for Calendar Year

Total Supply of Water in the Campus for Calendar Year __				
Month	**Source A** (Units)	**Source B** (Units)	**Source C** (Units)	**Monthly** Total
January				
February				
March				
April				
May				
June				
July				
August				
September				
October				
November				
December				
Source Total				
Total Annual Supply to the Campus				

- Every open over head tank needs to have a scale for measuring the water at each level.
- Where water is used in tanks, volumes can be estimated by multiplying the volume of the tank by the number of times it is filled of looking at the levels at which water has been there before and after filling.

- Where water is applied directly from a pipe, the average discharge rate can be multiplied by the total time during which it flows.
- Landscape use can be estimated by comparing watering routines. Frequency and duration of watering can be obtained from the persons responsible for landscape maintenance. Water uses from decorative fountains and pools need to also be estimated.
- Information on draining and refilling, and also on average daily evaporation can be obtained from facility operators.
- A per student or per resident use (drinking, bathing, flushing) can be applied to the facility wise population in the campus community.

Format 4: Water Audit

Campus Water Audit				
S No	Item	Water Volume		UNITS
		Subtotal	Cumulative Total	
1	Total Water Supply to the Campus (faulty metered and not accounted for)			
2	Adjustments to Total Water Supply:			
2a	Change in System Storage Capacity (+ or -)			
2b	Other Contributions or Losses (+ or -)			
	Total of Adjustments 2a+2b (+ or -)			
3	Adjusted Total Water Supplied to the distribution system (1 and 2)			
4	Metered Water Deliveries, corrected for meter lag			

5	Corrected Total Unmetered Water (Subtract 4 from 3)			
6a	Storm Drain Flushing			
6b	Sewer Cleaning			
6c	Street Cleaning			
6d	Landscaping			
6e	Academic Blocks			
6f	Decorative Water Facilities			
7g	Swimming Pools			
8	Water Lost to Leaks Since Repaired			
9	**Total Unaccounted-for Water** (Subtract Lines 8 and 9 from Line 6)			
10	Identified Water Losses:			
10a	Source Meter Error (+ or -)			
10b	Accounting Procedure Errors			
10c	Malfunctioning Distribution System Controls			
11	Total Identified Water Losses (Add Lines 10a through 11c)			
12	Unidentified Losses (Potential Leakage) (Subtract Line 12 from Line 10)			

Conducting a water audit is one way to discover evidence of insufficient record-keeping, faulty metering, illegal taps, leaking storage tanks, or leaking mains.

Plugging Leakages

- Leakage represents the largest share of wastage as well as unauthorized water use.
- Each source meter needs to be reviewed for accuracy, either by reviewing available meter test results or retesting the meter.
- System valves need to be checked periodically for malfunction. For instance, altitude control valves on storage tanks might be broken or set improperly, allowing the tank to overflow. These valves need periodic inspection, moreso when there is observed leakage or overflow
- Pressure relief valves which are set too low might cause spill when pressures reach the high range. These pressure relief valves need to be calibrated accordingly
- When problems are discovered during routine inspections, possible water losses need to be estimated and corrective action can be taken up immediately

Format 5: Leak Report

1. Describe the equipment and procedure you will use to detect leaks.

   _____

   _____

2. Which areas have the greatest potential for recovering leakage?

   _____

   _____

3. Describe your plan for effectively detecting leaks periodically.

   _____

   _____

   _____

Leak Detection and Repair Schedule

Beginning Survey date:_____ Approximate ending Survey date: _____ Beginning leak repair date:_____ Approximate ending leak repair date: _____

Prepared By:

Name: _____Designation: _____

Date: _____

Format 6: Leak Detection Report

Leak No.	Location or Address of Suspected Leak	Place	Leak Pin-pointed (Y or N)	Leak to be Rechecked (Y or N)	Leak Repaired (Y or N)	Not a Leak/Date

Indicate Number of	Meters	Hydrants	Valves	Test Rods	Other
Listening Points Used	_____	_____	_____	_____	_____
Kilometers of Main Surveyed	_____	Survey Time		_____ **hours**	
Number of Leaks Suspected	_____	To be rechecked		_____ **(Number)**	
Number of Leaks Pinpointed	_____	Pinpointing Time		_____ **hours**	
Remarks:					
Remarks:					

Leak Detection and Repair Project Summary

Report Prepared by: Date:

Leak Detection Survey

Total number of days leak surveys were conducted:__

First survey date:____/__/_____ Last survey date_/_____/_____

Number of Listening Points Used: Meters _____ Hydrants _____ Valves _____ Test Rods _____ Other _____

Number of Agency Leaks: Suspected _____ Pinpointed _____

Survey Time: _____hours

Miles of Main Surveyed:_____

Pinpointing Time: _____Hours

Average survey rate=_____Miles of main surveyed*8 =_____miles per day Total survey and pin pointing hours

TOTAL number of visible leaks reported since survey started, from other sources (not discovered during leak detection surveys.)

Leak Repair Summary

Date first leak

Repair Made:_____/_____/_____

TOTAL Water Losses from TOTAL amount of Excavated Leaks:_____

Date last leak

Repair Made:_____/_____/_____

TOTAL Water Losses from Non-excavated Leaks:_____

Losses:_

- Reducing excessive pressures in the distribution system can save a significant quantity of water.
- Reducing pressures decreases leakage, amount of flow through open taps, and leak-causing stresses on pipes and joints
- Water demand can be reduced directly or indirectly. Direct methods are those which physically suppress demand. They include changes in plumbing fixtures, pipe insulation to reduce waiting time for hot water to reach the tap.
- Indirect methods are those which offer an inducement to reduce water use. These methods primarily include water use pricing and billing, public education about water supply, use and conservation, and legal restrictions or limits on use.
- Using water-saving plumbing fixtures is the most effective way to minimize water use within residential, commercial, and institutional buildings.

Plantation

Some ways to encourage landscape design changes are:

- Plant low-water consumptive shrubbery and vegetation
- Restrict the size of lawn areas
- Encourage use of drought-resistant vegetation in new or redone landscaping.
- The watering method also influences evaporation rates. Fine sprays and high trajectories result in high levels of evaporation; large droplets and low trajectories minimize evaporation. Sprinklers need to be carefully placed to provide even application rates so that areas of over watering and under watering are avoided, and to avoid watering paved surfaces.
- Timers, hose meters and moisture sensors help manage lawn irrigation. Hose meters measure the amount of water used in irrigation, and can be set for desired amounts. Timers allow irrigation to be timed for desired early morning hours.
- Avoid mowing too short, too frequently, or during dry periods.
- Grass maintained at 2.5 inches or higher develops healthier root systems and is better able to withstand drought periods.
- No more than one third of the grass height needs to be mowed off at a time to avoid shocking the plant.
- Mowing during drought stress can kill a lawn. Mowing is best a day after watering.

Recommended Water Conserving Landscape Criteria

- Perimeter of Turf: Less than 20 lineal ft/unit
- Area of Turf: Less than 500 sq.ft./unit
- Turf Layout: Shallow or level slopes. Not used along long narrow pathways, in sidewalk strips or along foundations of buildings.
- Non-Turf Landscape Area: To be planted predominantly with water conserving plant materials available locally.
- Irrigation System: In ground, equipped with modern controllers and designed for at least 100 percent overlap (sprinklers need to throw from head to head) at low pressure for the site in order to achieve highly uniform precipitation rates. Design to include recommended monthly irrigation schedule on plans (minutes of run time and frequency for each valve), consistent with field capacity of soil and local evapotranspiration data. Appropriate selection of sprinkler heads.
- Soil Preparation: Prior to installation of landscape, tilling of ground, addition of organics and other additives as necessary to achieve a well drained soil with adequate water holding characteristics and chemically balanced to be a suitable environment for plant and grass roots.
- Encourage Use of: Rock plants for color and water-loving plants in n naturally wet or drainage areas.

Action Plan

Higher Education Institutions generally have vast land area with substantial scope for harvesting rainwater, maintaining green cover and compost yards. Therefore, universities can act as lung spaces for the city. The university administration needs to identify faculty members as well as students who are actually interested in water conservation.

Upon selection, each of them can be assigned care of one aspect of water conservation activity –

- Water conservation and rainwater harvesting
- Renovation of traditional and other water bodies/tanks
- Reuse and recharge structures
- Watershed development
- Intensive afforestation

Each group needs to comprise a faculty member and 5 to 10 students who will follow the initial steps:

- Study and monitor each area's current status on the campus
- Identify problems in that particular sector and their impact on people
- Devise methods or alternatives to solve issues
- Submit a report to the campus administration
- Follow them up weekly to initiate action

Step 1. Student Selection

- A qualifying test may be conducted to select students covering topics relating to sanitation and hygiene, water conservation and water related matters, team work, community responsibility, basic environmental science, health and hygiene, general knowledge; current affairs dealing with local news, sustainability and attitude.
- One method of achieving this is to give some writing assignment on various topics that cover questions such as “How do you want your future to be? Explain honestly what steps you will take to accomplish this? What are the impediments? How will you overcome them? Do you think you can actually get there?
- The Water Conservation/Jal Shakti Team will take a physical map of the University Campus and divide it into convenient zones.

- Alternatively, students may be chosen based on their willingness and interest to be a part of the programme. If students join the programme simply for extra grades, their presence may not benefit the programme. Hence, a qualifying test is preferred.
    - After selection and orientation, allow students to discuss the idea of campaign with friends and others in hostels and elsewhere to bring in more students willing to participate.
    - **Water Conservation Faculty Team** would thus select motivated and enthusiastic students to form into strong teams.

Step 2. Social Media Activities

- Create account or pages on social media platforms involving members of Water Conservation/Jal Shakti Team from different departments across the campus
- This will enhance a community feeling and aid in the proper conduct of the programme. Only issues relevant to the subject needs to be discussed by this group.

Step 3. Orientation of Water Conservation/Jal Shakti Student Group

- The Water Conservation/Jal Shakti Faculty needs to interact on latest aspects of water conservation in the campus and neighbourhood. The interaction could cover trends in cleanliness, sustainability, expectations from students, step-wise process of the Jal Shakti Campus Initiative.
- Participative Rural Appraisal and Participative Learning and Action techniques shall be adopted to survey, map the natural, human and material resources in the field and identify the priorities
- Interaction with Experts, NGOs and think-tanks, followed by group discussions
- Case studies and short documentaries can be showcased on successful water conservation campaigns conducted in other institutions
- Explain students what is expected of the team
- Classroom interaction on the field experiences and debriefing needs to be arranged once a month, to make mid-course corrections and sharing
- Conduct in-field training and workshops

Step 4. Mapping the Campus: Survey and Ground-truthing:

- Water Conservation/Jal Shakti Students Group teams work together across departments to prevent any overlap.

- The survey is to be conducted in three methods: observation, questionnaire and interview. Each student needs to observe an identified area. The student needs to interact with least 20 residents and employees on the campus on the current water scenerio there.
- The questionnaire is to be structured around Water conservation and rainwater harvesting, Renovation of traditional and other water bodies/tanks, Reuse and recharge structures, Watershed development, Intensive afforestation. A common questionnaire needs to be used to get consistent information.
- Seek ideas, opinions and suggestions from stakeholders to improve the campus along with their willingness to participate.
- This survey needs to spread awareness regarding Water Conservation Campus Initiative and popularize the concept within the campus and beyond.
- Teams surveying the campus needs to get in-depth information and clear understanding of the current scenario to help analyse, and generate creative, practical ideas and solutions.

Step 5. Identifying areas for immediate action

- After survey and ground study, the Water Conservation/Jal Shakti Students Group needs to collate and draw
- inference from the data
- Survey results need to be consolidated into a convenient format for analyses.
- Areas which need immediate attention have to be listed.
- The list is to be marked on the campus map and displayed.
- After survey at Student Group level, a team meeting of all departments needs to be conducted for exchange of ideas and holistic understanding of the campus scenario.

Step 6. Planning Interventions

- Chart out interventions to be planned for Water conservation and rainwater harvesting, Renovation of traditional and other water bodies/tanks, Reuse and recharge structures, Watershed development, Intensive afforestation
- Incorporate on the campus a map for easy reference.
- Wherever reduction or replacement is possible, it needs to be clearly stated.
- A comprehensive report of the findings of survey, planned interventions and assistance needed from the designated authority needs to be submitted by the Water Conservation Faculty at a face-to-face meeting.

- Based on the report and discussions, the designated authority can deliberate on funding needs, logistic requirement (including hiring of extra staff, changing certain fixtures like lights and flushes) and external support that can be garnered for this campaign.
- This discussion will give the campus officials an opportunity to prepare policies for Jal Shakti Campus and instruct staff to make internal changes in day-to-day activities.
- After checking feasibility of every recommendation, the designated authority considers giving approval to appropriate interventions to be made on campus.

Step 7. Education and Awareness

- While logistics are being arranged by the campus officials, the Water Conservation/Jal Shakti Team can prepare an awareness campaign, based on the campus officials' approved interventions list.
- Water Conservation/Jal Shakti Students Group can prepare appropriate signage.
- Water Conservation/Jal Shakti Team can conduct awareness campaigns across the campus. If needed, alliances with government bodies and NGO groups could be brought in to bolster the campaign.
- Innovative ideas from students and staff, certain rewards, rallies and cleanup drives can be announced (after approval from the campus officials).

Step 8. Implementation of Jal Shakti Campus

After the foundation for Jal Shakti Campus campaign is laid, the logistics (equipment and staff) are to be put in place. Campus leaders themselves need to bring certain visible changes on the campus. Start work on planning, management and implementation.

Format 7: Record-keeping and Supervision

Form a committee to audit water consumption. This committee may include staff, faculty and student groups.

University / HEI: Jal Shakti External Member: Jal Shakti Team Leader:
Jal Shakti Core Team:
Jal Shakti Faculty:
Jal Shakti Administrative Staff:
Jal Shakti Students Team:

Step 9. Analysis

- The water audit documents, Jal Shakti action plan and evaluation documents, feedback and review documents help the Jal Shakti Team to focus on the priority areas for implementation and also fix responsibility on the team that is working on the problems areas to complete the action within a given timeframe. These may be in hard copies, electronic format, or both as per the convenience of the institution. It is important to maintain standard formats for the ease of comparison.
- The Jal Shakti Team plays a vital role in supervision, reporting, quantifying, observing compliance as well as non-compliance of the new rules. The team's findings will be shared within the department and during inter-departmental meets and incorporated in the analysis.

Format 8: Action Plan for Implementation & Evaluation

Action Area	Key Challenges/Findings to be addressed on a priority basis drawn from water audit	Action to be Taken	Action Start Date	Action End Date	Outcome	Remarks	Assessed by
Water Management							
Water conservation and rainwater harvesting							
Renovation of traditional and other water bodies/tanks							
Reuse and recharge structures							
Watershed development							
Intensive afforestation							

It is but natural that the students participating in the Jal Shakti Campus Initiative will be working on this project parallel to their regular studies. Team members will take turns to be there in the team. To compensate for the time and effort they spend on the Initiative, it is suggested that Water Conservation/Jal Shakti can be developed into an elective course. Campus heads can decide on the credit system for this course.

Students needs to attend all the meetings of the Water Conservation/Jal Shakti Team and maintain a separate record book in which they will note all the happenings, such as survey details, findings, plans, actions, observations, etc. This record book needs to be maintained by the respective Water Conservation/Jal Shakti Faculty and scrutinised every week. Attendance could be marked at each meeting (within the department and also interdepartmental).There can be seminar presentation incorporating the progress report, and a continual assessment based on the Water Conservation/Jal Shakti Faculty's observations.

Step 10. Student Water Conservation/Jal Shakti Kendra

- The university may designate space in one of the buildings which can be used by the Jal Shakti Team to hold monthly meetings and training programs.
- Jal Shakti Student team and NSS team can be asked to work together on Water Conservation.
- In time, the University can find funding to expand this space into a full-fledged Student Environment Centre or Water Conservation Centre built on green building guidelines and taking into cognizance the requirements and aspirations.
- University may assign full-time/part-time staff to manage the Water Conservation activities or allow senior students to intern.
- Water Conservation Centre could be the hub for water conservation projects, weekly or monthly meetings, preparing for Water Conservation/Jal Shakti relevant days.

Step 11. Reporting

- The results of analysis will reveal several aspects of information on water worth reporting. Reporting needs to be done by incorporating only factual and objective information.
- Both internal and external reports are necessary. Internal reporting encourages accountability and ownership. It provides aggregate information on the performance summarizing its findings, and providing conclusions of the assessment against pre-determined criteria.
- Internal reports on Water Conservation/Jal Shakti Campus Initiative need to be circulated within the campus through intranet and in-house magazine.
- Small parts of the report can also be displayed on notice boards, updating them every week. Mention the link to read the full report online and encourage the students to read the full report.
- External Reporting targets stakeholders outside the campus. External reports need to be accurate, timely and of high quality, reviewing the effectiveness of the Water Conservation/Jal Shakti Campus Initiative with absolute transparency. They need to be made available on the official website of the institution. The availability of the report needs to be widely publicised.

Step 12. Feedback & Review

- Once the reports are published, they will be reviewed by people on- and off-campus. This needs to result in feedback from the readers.

- Feedback could be positive, e.g. appreciation, fresh ideas to improve the implementation of the Water Conservation/Jal Shakti Campus Initiative. Feedback could also be critical of the effort, criticizing some of the policies and practices. The critical feedback needs to be seen as a reality check to identify areas of improvement and find alternative solutions to overcome these. Feedback is also a tool to evaluate student, staff and team performances.
- Feedback can guide the future course of action for the university. It is important that the feedback is received in a proper format. So, create a well-drafted feedback form on the website and at the end of the physical reports. The feedback forms need to have plenty of white space to write. The questions need to be crisp, with clear goals.

Step 13. Improving the Programme

Feedback helps the organization to adopt recommendations, improve their knowledge, planning and implementation. Wherever a need arises to make modifications, the Water Conservation/Jal Shakti Team will suggest them to the decision makers in the campus. The final output of the findings and the suggestions will be implemented after approval.

Step 14. Modifying the Water Conservation/Jal Shakti Policy

Based on the first year's learning from Water Conservation/Jal Shakti Campus Initiative, decision makers in the campus need to draft a policy document relating to sustainable use of resources on campus and responsible management of water. The Water Conservation/Jal Shakti Faculty can assist in this process with inputs from Water Conservation/Jal Shakti Student Group.

Step 15. Presentation/Celebration of Achievements

Prepare a Performance analysis and ranking table for Rewarding the Teams:

It takes a while for visible, tangible change to appear on the campus following introduction of any system and to result in stability and satisfaction. Once the Water Conservation/Jal Shakti Campus Programme has been run successfully on campus for one year, names can be suggested for rewarding good work. The people so recognized need to be from among cleaning staff, maintenance staff, Water Conservation/Jal Shakti department, most dedicated Water Conservation/Jal Shakti Faculty and deeply involved student team members or Water Conservation/Jal Shakti Students Team, most innovative idea provider. A formal function needs to be organized to felicitate these efforts. Media and alliance partners from different fields need to be invited and thanked for their efforts. Following this, the Water Conservation/Jal Shakti Faculty and designated authority needs to find avenues to portray their success story through various media like short movie on local TV channels, campus broadcasting.

Outreach

As the Water Conservation/Jal Shakti Campus Initiative progresses over a period of time, it is likely that many outsiders would visit the campus to learn more and to get the University's support in replicating the same model in their areas. For this, the campus needs to have a visitor centre and support team to conduct a guided tour and give necessary information to the visitors.

This is not the end of the road. Students enrol into the university every academic year. The process needs to begin afresh every year to involve the new entrants. Though identifiable challenge areas will be fewer every year considering that work at ground level has been happening already, students will still learn being involved in all the practical aspects of running the Water Conservation/Jal Shakti Campus Initiative.

Convergence with Mandates/Government Programmes

Water Conservation/Jal Shakti Campus Initiative can be converged with certain government programmes and mandates such as Unnat Bharat Abhiyan, Rurban Mission, Smart City Mission, Swachh Bharat Abhiyan, ODF or Total Sanitation Campaign whenever possible or appropriate.

Water Conservation/Jal Shakti Students Teams support the village the institution has identified to engage with under the UBA or SAP or NSS to study and support the villagers with implementable solutions through participatory planning, especially in water management, energy use and sanitation.

Table 4 : Convergence of Water Conservation/Jal Shakti Campus Initiative with Govt. Program/Mandates

S.NO	Details	Response
1	Name of the Water Conservation/Jal Shakti Team	
2	University/HEI	
3	Department	
4	Activity Chosen	
5	Activity Start Date	
6	Activity End Date	

7	Govt programs that the activity converges into	
8	Village chosen	
9	List of tasks implemented	
10	Key outcomes achieved	
11	List of tasks pending for Implementation	
12	Next actions	
13	Program status assessed on	
14	Program status assessed by	

Convergence with other Technical Courses

Certain technical courses such as Environmental Engineering, Environmental Science, Environmental Economics, Water Management, Green Buildings, Green Electricity and Resource Management already share some aspects of the Jal Shakti Initiative.

Celebration of Key Environment-Related Days

- Universities/HEIs are urged to celebrate key water related days like World Wetlands Day Feb 2nd and World Water Day 22nd March to focus on persisting issues and to rededicate themselves to the cause.
- Water Conservation/Jal Shakti Teams can utilize the opportunity of these internationally observed dates to bring change within their campus and community.
- Along with awareness drives, rallies, and slogan/ drawing competitions, Water Conservation/Jal Shakti teams can plan proactive events on the campus, involving practical interventions that can be followed on by the student teams making tangible impact on the campus ecosystem.
- Keep these celebrations open to public. If needed, move them to the nearest Sunday/holiday for maximum public participation. Inform well in advance through events columns of local newspapers, radio channels and social media.
- The Water Conservation/Jal Shakti teams needs to plan more activities suited to their campus. The University/HEI needs to grant a small fund for the proper conduct of the events.

Table 5: Ways to Mark Water Related Days

World Wetlands Day	Feb 2	Revisit recycling system on campus, rainwater harvesting structures, organize a stream/ river/ well/ pond cleaning exercise, initiate drip irrigation on campus, separating storm water and drain water, survey and correct or check damaged water supply pipelines and water wastage zones.	
World Water & Sanitation Day	Mar 22		
World Earth Day	April 22		
World Environment Day	June 5		
World Water Monitoring Day	September 18		

Format 9: Record of observing Key Water Days

S.No	Name of Water Conservation/Jal Shakti Team	
1	University/HEI	
2	Department	
3	World Water Day	
4	Activities Conducted	
5	Awards Presented (if any)	
6	Any other Information	
Record Prepared by:		
Record Verified by:		

Jal Shakti Campus Score Card

The ranking of institutions covers basic parameters of water management, water conservation, rain water harvesting, renovation of traditional and other water bodies/tanks, reuse and recharge structures, watershed development, intensive afforestation, sanitation and hygiene, hostel kitchen hygiene, solid and liquid waste management, water purity, water availability, and over all ambience of the campus. Some suggested parameters are given below which are not exhaustive but are indicative. Technical institutions have been given slightly varying, more intensive parameters.

Waste Water Management Initiatives

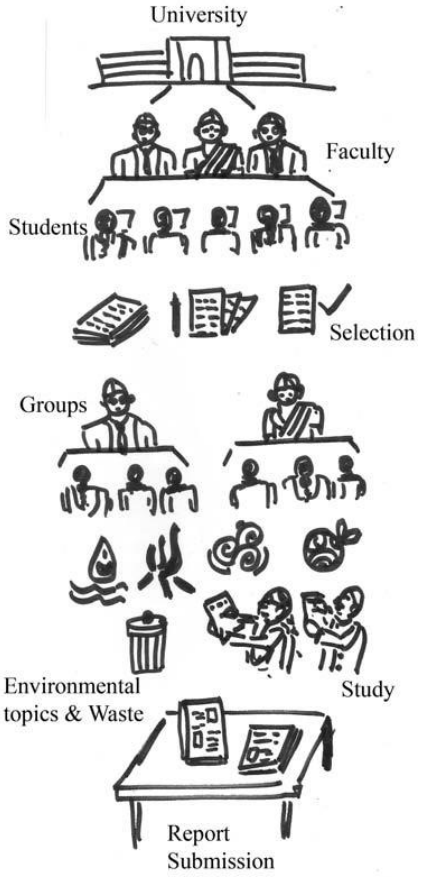
It is important to appreciate the initiatives taken by the management on issues related to waste water. For technological institutions installing and managing a water management system would be required as part of the institution level interventions expected while for non-technical institutions engagement with neighbourhood community, slum or village for ensuring that it is Jal Shakti campus. The approach in management of waste water by the Higher Education Institutions needs to be assessed.

Format 10: Questionnaire

- Which officer and department in the HEI is in charge of drinking water conservation/efficiency?
- Does the HEI require preparation of drought emergency plans?
- Does the HEI have a mandatory planning requirement for drinking water conservation separate from drought emergency plans?
- Does the HEI require implementation of conservation measures as well as preparation of plans?
- Does the HEI have the authority to approve or reject the conservation plans?
- Does the HEI have minimum water efficiency standards?
- Does the HEI regulate drinking water supplies and required conservation as part of its permitting/licensing/contract awarding process?
- Does the HEI have a water consumption regulation for toilets?
- Does the HEI have a water consumption regulation for shower heads?
- Does the HEI have a water consumption regulation for urinals?
- Does the HEI have a water consumption regulation for cloth washing machines and cloth washing activity on the campus?
- Does the HEI have mandatory building or plumbing codes requiring water efficient products?
- Does the HEI allow funding for conservation programs?

- Does the HEI offer direct or indirect technical assistance?
- Does the HEI submit campus water status reports periodically?

The sustainable management of our freshwater resources is a crucial component of supporting future population and economic growth. An integrated approach to water management is recommended to address current water challenges, which are often interrelated with other environmental, economic and social issues. Universities and colleges have missions, resources, and contexts that could enable them to lead the process of developing and applying sustainable and integrated water resource management. Higher education institutions are major drivers of change in achieving environmental sustainability both within the campuses and beyond campuses in communities at large. However, achieving campus sustainability is not possible without the involvement of all campus stakeholders including the students as one of the major stakeholders of a university.



Feedback received can be chronicled as Suggestions as below Example

- Campus can have fruit bearing trees. It is better to grow wild varieties in order preserve the seeds of wild varieties. Wild varieties are strong and disease resistant.
- One student - one tree - has to be achieved and sustained as envisaged by the Ministry of HRD.
- Trees like coconut do not occupy much space. They add to the beauty of campus round the year. Their maintenance does not require much water. Campus waste water can be channeled to them.
- Time Table for maintenance of garden can be kept for improvement. This can be an engagement for everyone on the campus
- Taps can be turned two rounds for washing hands. This can be labelled at all taps of the campus
- Campus shall have siren or alarm if the water used is above average. This helps self audit for water consumption
- Use of washing powder saves water. A separate channel of washing water can be reused for toilet flush
- Construction plan can include water recycling aspects and processes.
- The more the ground water is avoided the better it is
- Campus can grow bamboo as they multiply from shoot and grow faster with less water

- Trees which are wild like Acasia nilotima Balla thumma have multiple uses. They tide over drought conditions. Leaves are food for sheep. Wood is used in carpentry. They have deep roots, have thorns and are low in transpiration. Their propagation is easier as they produce pods for seed dehiscence.
- NSS and NCC cadets can label trees as their campus 'heritage' trees and have a Chair for it. Blue ribbon can be tagged/ worn on the shirt pockets to stay promising for saving water.

HEI Administration in Water Conservation

Heads of Institution

- Include a section in the academic mission statement to establish the credentials of the student in matters of water conservation, environment protection and sustainability.
- The wording can be “students, upon graduating, will possess the knowledge, skills, and values to work toward a sustainable water use,” or such.
- Provide resources to train, orient, engage and appoint expert faculty members and staff to lead such courses.
- Annual funding requirement and high investment initiatives will be met by the heads of institutions as per the rules of the Institution.
- Arrange a meeting of all the stakeholders and explain the performance and the outcomes expected out of the campaign for making the institution a 'Jal Shakti Campus'.
- While explaining the plan of action, the roles and responsibilities of each stakeholder shall also be narrated.

Heads of Department

- Raise campus awareness about the need for water conservation
- Provide incentives for action, such as campus-wide “Ecolympics” competitions.
- Share Annual Reports with members of the campus community including staff, faculty, students, alumni, foundation donors, corporate donors, government officials, environmental leaders, community leaders and the public at large.
- Publish on the Institution's website.

Registrar/Head of Non-teaching Staff

- Give a list of measures for Water Conservation to all employees. Conduct an orientation programme for all employees.
- Ensure all employees are contributing to the Water Conservation Initiative

Academic Heads

Provide resources for respective faculty to integrate environmental issues and perspectives into their existing courses by developing and launching faculty training programs, holding seminars on Water Conservation, and by including field work and demonstration in the teaching methods.

Incharge of Student Affairs

- Work with the counselling team in creating and implementing the orientation programme for first termers
- Explain the rules to follow for a Water Smart Campus to Faculty Members (Professors, Associate professors, Assistant Professors)
- Support the Water Conservation Faculty as well as NSS coordinator in their initiatives

NSS Coordinator

- Would support the Water Conservation/Jal Shakti team of all departments
- Will look into overall aspect of Water Conservation Initiative
- Involve the NSS members into the Water Conservation Initiative
- Survey the campus fortnightly
- Conduct a surprise visit once a month
- Motivate students for smooth conduct of the Water Conservation Initiative

Building Maintenance Managers Look into aspects of water conservation, waste water management and cleanliness

Dining Hall/Canteen Managers Kitchen and food water management, cleanliness, waste water management, water conservation

Research Associates

- Can introduce and deploy water conservation practices and technologies in their research field and laboratories
- Encourage other students in these practices and technologies in the laboratories
- Residents of campus Support the water conservation initiatives even at their residence

Industries

- Can have Water Conservation as a stamp for promoting their products

- Improve industry performance by recruiting students with such training.

Non-profit Organizations

- Invite locally active, relevant NGOs to help with awareness campaigns or connecting to external vendors, self-help groups in preparing the staff and residents of the campus for adopting the new methodologies
- They could bring field experience in areas of water conservation, water harvesting, energy conservation, increasing green cover with the right blend of vegetation and others.

Water Conservation Organizations

Assistance/guidance may be sought from World Water Council, Project WET, Clean Water Action, Water Aid, Water.org, Blue India Program, Clean WASH Program, FORCE Institute of Water Efficiency/Social Innovation, Green Building Council, Municipalities, Local Bodies, Centre for Science and Environment (CSE) and Council on Energy, Environment and Water (CEEW).

Water Conservation Faculty Members

- Introduce to students the Water Conservation campaign in the campus
- Create interest among student community to volunteer in the initiative
- Guide them in carrying out the campaign effectively
- Supervise the work done by the Water Conservation/Jal Shakti Student group
- Put forth the recommendations of the students group in front of the campus management
- Work with the management and the students in implementing the Water Conservation initiative

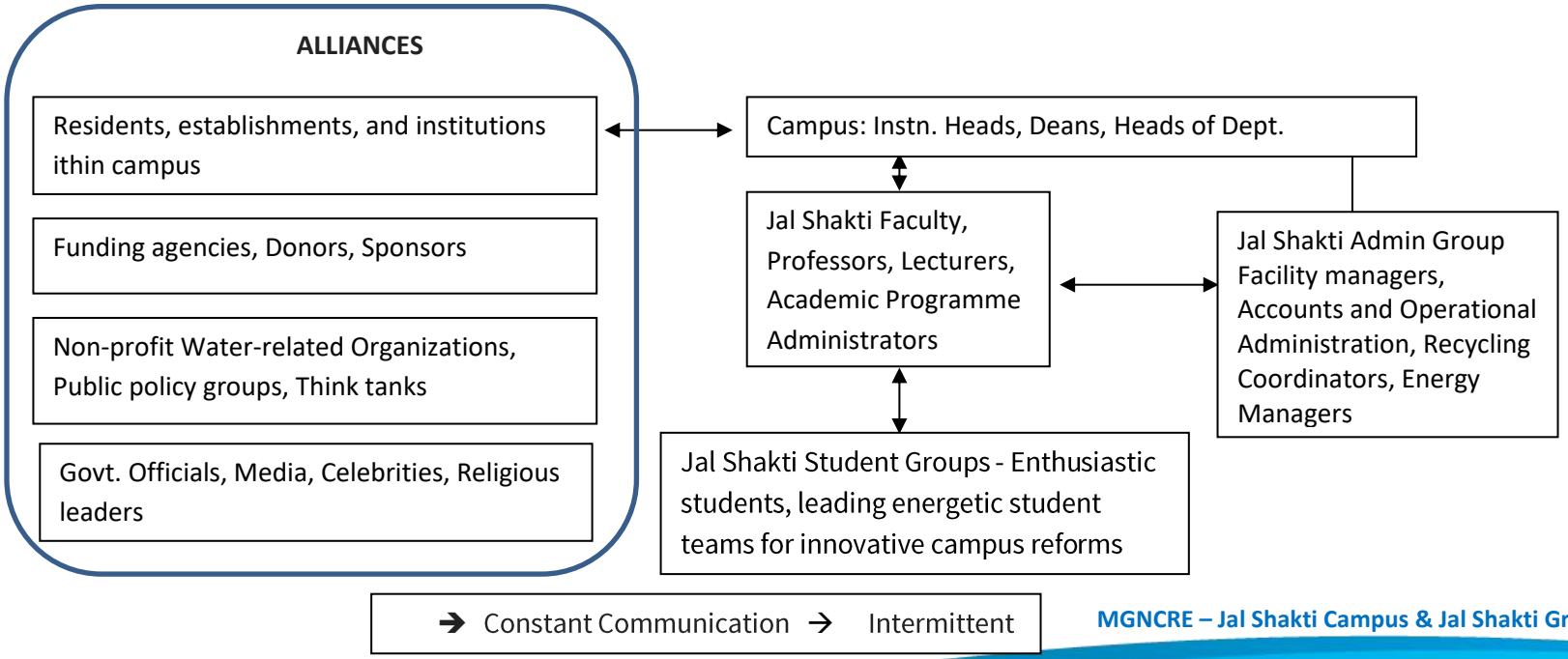
Water Conservation/Jal Shakti Students Group

- Carry out the survey/audit of the campus
- Analyse the effects of regular activities taken up in the campus
- Sort out the alternatives for such activities that cause least damage to the surrounding environment
- In collaboration with the Water Conservation Faculty, present those solutions to the campus head officials
- Persuade the head officials to implement those alternatives.
- Show them what are the pros and cons of taking up the initiative.
- Find ways in which they can implement

Partnering with other institutions and agencies

The campus is a fully functional unit but not a closed entity. It needs strong alliances to bring the dream of a Water Smart Campus to fruition. Some of the alliances that will support the endeavour are

- Funding Agencies: MHRD/UGC/AICTE
- Donors: Alumni, NGOs, Private Foundations and corporate houses, etc.
- Non-profit Organizations: To help with awareness campaigns or connecting to external vendors, self-help groups
- Public Policy Groups and Think Tanks: Assistance/guidance may be sought from World Water Council, Project WET, Clean Water Action, Water Aid, Water.org, Blue India Program, Clean WASH Program, FORCE Institute of Water Efficiency/Social Innovation, Green Building Council, Municipalities, Local Bodies, Centre for Science and Environment (CSE) and Council on Energy, Environment and Water (CEEW).
- Media and Celebrities: Long-term collaboration with media and celebrities provides impetus to mobilize the campus residents.
- Government: The Government launches new environmental schemes from time to time. The Institute can benefit from these schemes and make them a part of the campaign for Water Conservation.



Instituting the Water Conservation Policy

The stakeholders need to be involved in drafting a policy document relating to sustainable use of resources on campus and responsible management of water. The identified faculty can assist in this process with inputs from the identified Student Group. Once the document is finalized, all residents, staff, private businesses and students on the campus need to adhere to each of the policy components.

The approved document can contain at least the following

a. Water conservation policy: including optimum use of water, reuse of treated water, water saving appliances, rainwater saving practices and use of plants to clean and retain water
b. Rain water harvesting policy: Porous pavements, Harvesting pits
c. Water Management Policy: The HEI needs to commit to following the Water Management and Conservation Policy. Include specific procedures for different types of waste water collection, recycling, rainwater harvesting and rules and regulations.
d. Student Activity Policy: Maintenance and management of water also during students' cultural programmes or any student activities.

Suggested Reading: Case Studies

- Design of rainwater harvesting system at Shilpa Hostel in JNTUA College of Engineering Ananthapuramu: A case study from Southern India: Meda Kalyan Kumar JNTU
- 17 lakh litres of rainwater conserved through rainwater harvesting - Case study of RV College of Engineering, Bangalore from the work of Biome Environmental Solutions - Article from Clean India Journal
- Rooftop Rain Water Harvesting Potential: A Case Study of Dahivadi College Building and Campus in Man Tahsil of Satara District: C. J. Khilare1, S. N. Pawar D. D. Namdas and V. P. Gaikwad
- Water Conservation and Water Management Model through Institute, Industry and NGO Collaboration – A Case Study Mona N Shah, Mangesh Madurwar
- Rainwater Harvesting System at Jamia Hamdard University New Delhi
- Rainwater Harvesting System at Goa University
- Constructed wetland to treat Wastewater at Indian Institute of Technology, Powai, Mumbai
- Rainwater Harvesting System at Centre for Science and Environment
- On-site and Off-site Impact of Watershed Development: A Case Study of Rajasamadhiyala, Gujarat, India. Global Theme on Agroecosystems: International Crops Research Institute for the Semi-Arid Tropics.

JAL SHAKTI GRAM

Jal Shakti Gram Initiatives Promoted by Higher Education Institutions

Role of Higher Education Institutions in Jal Shakti Village

- Each HEI which participates in Jal Shakti Campus will identify the neighboring village as Jal Shakti Village.
- A core team consisting of key stakeholders including the HEI participants may be formed under the leadership of the village. The team shall work as “Gram Jal Shakti Team”. The HEI Jal Shakti Team will provide technical support to the Gram Jal Shakti Team
- The Gram Jal Shakti Team with the support of HEI Jal Shakti Team will be involved in all aspects of Gram Jal Shakti viz., Participatory Rural Action, Participatory Learning and Action for exploring, surveying, fact-finding, recording, planning, and monitoring of activities relating to water conservation.
- Gram Jal Shakti Team Create awareness on the need for water conservation in village and gain consensus through involvement of all members in the village.
- Facilitate design of specific interventions for enabling the Village water sufficient and water use efficient by following best available standards and accepted parameters.
- Monitor the existing water management in the village with participation and transparency.
- Present a step-by-step guide for conserving water in the village.
- Document case studies on best water conservation practices adopted in the village.
- These instances can serve as models for other higher education institutions to adopt the village and to emulate for other villages.

Table 1. Geographical Profile of Jal Shakti Village

S.NO.	Village profile	YES	NO
1.	Is the village located in coastal area?		
2.	Is the village located in hilly area?		
3.	Is the village located in Desert area?		
4.	Is the village located in plain area?		
5.	Is the village located on the water front		
6.	Is the village located on the road side		
7.	Is the village located in remote area		

2. Jal Shakti Village Status

Table 2: Master Chart for Assessing whether the village is Water Smart (Maximum 100 Points)

S No	Criteria	Fully (2 Points)	Partially (1 Point)	Not Yet (0 Point)
1	**Water Budget**			
	a. Does the village recognize the need to prepare water budget for short term, day wise, week wise, month wise, and quarterly (seasonal) water budget?			
	b. Does the village prepare water budget for short term, day wise, week wise, month wise, and quarterly (seasonal) water budget?			
	c. Does the village have rain gauge and rain recording system at various locations?			
	d. Does the village have rainwater harvesting structures constructed for each area?			

	e . Did the village design and install contour trenches as per the local capacity, terrain, gradient of land, soil porosity and rainfall?			
	f. Did the village design and install artificial ponds as per the local capacity, terrain, gradient of land, soil porosity and rainfall?			
	g. Did the village design and install roof top water harvesting structures as per the local capacity, terrain, gradient of land, soil porosity and rainfall?			
2	**Water Quantity and Quality Monitoring**			
	a. Does the village intend to designate its various sources of water for various uses basing on the quality and recyclability?			
	b. Did the village designate its various sources of water for various uses basing on the quality and recyclability?			
	c. Does the village regulate use of ground and surface water (use best quality of water for best use and lower quality of water for cleaning and washing as well as flushing)?			
	d. Does the village carry out rainwater harvesting in identified locations (forming total village into manageable zones based on the terrain and gravity)?			
3	**Monitoring and Management**			
	a. Does the village intend to install water use meters and flow meters at all bulk water dispensing locations and tanks?			
	b. Did the village install water use meters and flow meters at all bulk water dispensing locations and tanks?			
	c. Does the village keep the ground water drawn metered and monitored?			
	d. Does the village conduct the water audit followed by the preparation of water budget for the village?			
4	**Monitor Overhead Tanks**			
	a. Does the village intend monitoring the differences in levels of water in the overhead tank from the beginning of every day?			

	b. Does the village monitor the differences in levels of water in the overhead tank from the beginning of every day?			
	c. Does the village ensure that the tanks are full at the beginning of each day?			
	d. Does the village note the difference in levels of water for estimating the consumption of the day?			
	e. Does the village record daily consumption ?			
5	**Motor Metering Method**			
	a. Does the village intend to measure per minute pump-wise flow of water?			
	b. Does the village measure per minute pump-wise flow of water?			
	c. Does the village monitor number of hours the water pump is switched on?			
	d. Does the village calculate water output?			
	e. Does the village measure the flow of water every time the motor runs to estimate withdrawal of water?			
	f. Does the village have an ongoing program to monitor, check, repair, and replace meters?			
6	**Estimation of Water Yield Capacity from all Sources of the Village Water**			
	a. Has the village planned to identify the sources of the village water and the capacity of yield from each source?			
	b. Has the village identified the sources of the village water and the capacity of yield from each source?			
	c. Has the village identified various uses of water in every village unit(part of)?			
	d. Does the village measure and monitor water table in the Village and the seasonal variations in it?			
7	**Start Water Conservation**			
	a. Does the village intend to take steps in mending the leaks in taps and pipes with a designated frequency?			

	b. Does the village take steps in mending the leaks in taps and pipes with a designated frequency?			
	c. Does the village school, anganwadi, health centre, post office have two levels of flushing for optimum water use introduced in all toilets?			
8	**Manage Water**			
	a. Does the village intend to introduce less-water-intensive agricultural practices, gardens and lawns?			
	b. Does the village have less-water-intensive agricultural practices, gardens and lawns?			
	c. Is the village willing to replace the present water intensive agriculture, gardens and lawns immediately?			
9	**Introduce Recycling**			
	a. Does the village have effective water drainage system in the village basing on the bulk water usage and dispensation points?			
	b. Does the village have water recycling opportunities in the village basing on the bulk water usage and dispensation points?			
	c. Does village practice first-in first-out method for retaining the quality of drinking water?			
	d. Does village practice counter current method of using Best Quality Water for Best Use Viz., drinking, bathing, gardening, and cleaning?			
10	**Plugging Leakages**			
	a. Does the village intend to have ward-wise (area-wise) water watching team which stops the water wastage?			
	b. Does the village have ward-wise (area-wise) water watching team which stops the water wastage?			
	c. Does the village adopt a method of geo tagging the water leaking points and app-based alerts of the plumbers to arrest water leakages and water stagnation-related challenges?			

11	**Plantation**			
	a. Does the village intend to plant roadside trees?			
	b. Has the village planted ornamental roadside trees, monoculture and China grass lawns?			
	c. Is the village willing to replace or plant select local species that are resilient, fruit-bearing, useful plants in place of present irrigation intensive plants?			
	d. Will the village avoid planting lantana and other exotic species?			
12	**Administration**			
	a. Does the village intend to form Village Jal Shakti Team?			
	b. Did the village form Village Jal Shakti Team?			
	c. Have the Village Jal Shakti Teams started working			

Result: Water Smart – 75% points Yes – compliant

Table 3. Sources of water in Village

S No	Criteria	Fully (2)	Partially(1)	Nil
1	**Domestic use(12 points)**			
	a. Is the well the main source of Domestic use?			
	b. Is the hand pump the main source of Domestic use?			
	c. Is the bore well the main source of Domestic use?			
	d. Is the village tank the main source of Domestic use?			
	e . Is the municipal water the main source of Domestic use?			
	f. Is the verhead tank the main source of Domestic use?			
S No	**Criteria**	**Fully(2)**	**Partially(1)**	**Nil**
2	**Agricultural use(12 points)**			
	a. Is the well the main source of Agricultural use?			
	b. Is the canal the main source of Agricultural use?			
	c. Is the bore well the main source of Agricultural use?			
	c. Is the village tank the main source of Agricultural use?			

	d . Is the stream the main source of Agricultural use ?			
	e. Is the pond/lake the main source of Agricultural use ?			

4. Consumption of Water

Table 4: Consumption of water in different age group

Consumption of water in litres in a Family*		Age>60	Age group 50-60	Age group 40-50	Age group 30-40	Age Group 30-20	Age Group 20-10	Age Group 5-10	Age Group 1-5	Infants
Summer	Per day									
Summer	Per Week									
Summer	Per Month									
Summer	Quarterly									
Monsoon	Per day									
Monsoon	Per week									
Monsoon	Per Month									
Monsoon	Quarterly									
Winter	Per day									
Winter	Per Week									
Winter	Per Month									

*Calculation may be made approximately

Table 5: Water Consumption by Distinct Groups of Village

Table – : Calculate approximate consumption of water for a distinct group.				
S No	**Distinct Groups**	**Domestic Consumption in Litres/Day/per capita**	**Non-domestic consumption in Litres/Day/ per capita**	**Remarks**
1.	Rich landlords / Traders/ Businessmen			
2.	Middle income group			
3.	Low Income group/ Daily wage labors			
4.	Below poverty line / no land / no work			
5.	Others			
	Total Consumption			

$$\text{Per Capital per Day Domestic Consumption} = \frac{\text{Total Domestic Consumption}}{\text{Number of People}}$$

$$\text{Average Domestic/Non-Domestic Consumption} = \frac{\text{Sum of Avg. water consumption of distinct groups}}{\text{Number of Distinct groups}}$$

Table 6: Assessing Village Score in Water Conservation

2.1 Water Budget (source wise and bulk usage location wise)													
S No	**Criteria**	**Day Wise(in 000s litres)**			**Week Wise(in 000s litres)**			**Month Wise(in 000s litres)**			**Quarterly(in 000s litres)**		
	Water												
		Source 1	**Source 2**	**Source 3**	**Source 1**	**Source 2**	**Source 3**	**Source 1**	**Source 2**	**Source 3**	**Source 1**	**Source 2**	**Source 3**
1.	Water Availability												
2.	Usage of Water												
3.	Water Quality												
4.	Rainwater Harvesting												
5.	Recycling												
6.	Village Initiatives												
Estimation of Yield of water from each Source of Water (1 point)													
		Day Wise (in litres)			**Week Wise (in litres)**			**Month Wise (in litres)**			**Quarterly (in litres)**		
	Source	**Source 1**	**Source 2**	**Source 3**	**Source 1**	**Source 2**	**Source 3**	**Source 1**	**Source 2**	**Source 3**	**Source 1**	**Source 2**	**Source 3**
Water Requirement													
	Estimated Water Requirement	**Day Wise (in litres)**			**Week Wise (in litres)**			**Month Wise (in litres)**			**Quarterly (in litres)**		
		Source 1	**Source 2**	**Source 3**	**Source 1**	**Source 2**	**Source 3**	**Source 1**	**Source 2**	**Source 3**	**Source 1**	**Source 2**	**Source 3**
1.	Drinking												
2.	Bathing												
3.	Washing												
4.	Flushing												
5.	Agriculture and Horticulture and for other cultivation												
6.	Animal Husbandry, Poultry and other similar activities												
7.	Other uses												

Availability of Water (Surplus/Deficit)													
	Purpose of water needed for consumption (Expressed in %)	**Day Wise (in litres)**			**Week Wise (in litres)**			**Month Wise (in litres)**			**Quarterly (in litres)**		
		Source 1	**Source 2**	**Source 3**	**Source 1**	**Source 2**	**Source 3**	**Source 1**	**Source 2**	**Source 3**	**Source 1**	**Source 2**	**Sourc e 3**
1.	Drinking												
2.	Bathing												
3.	Washing												
4.	Flushing												
5.	Agriculture and Horticulture and for other cultivation												
6.	Animal Husbandry, Poultry and other similar activities												
7.	Other uses												

Consumption (Excess/Deficit)													
	Proportion of Water Drawn (%) in excess/ need to be supplemented	**Day Wise (in litres)**			**Week Wise (in litres)**			**Month Wise (in litres)**			**Quarterly (in litres)**		
		Source 1	**Source 2**	**Source 3**	**Source 1**	**Source 2**	**Source 3**	**Source 1**	**Source 2**	**Source 3**	**Source 1**	**Source 2**	**Source 3**
1.	Drinking												
2.	Bathing												
3.	Washing												
4.	Flushing												
5.	Agriculture and Horticulture and for other cultivation												
6.	Animal Husbandry, Poultry and other similar activities												
7.	Other uses												

Source 1: Pipeline through gram panchayat
Source 2: Well, borewell and tubewell in the village
Source 3: Waterfall, stream, canal, village tank

Table 7 : Water Recharge Structures in the village

Table – : Capacity of storage tanks or underground recharge structure (in 000s litres)				
S. No.	**Recharge**	**Storage**	**Capacity**	**Remarks**
1.	Structure 1	Tank/lake/harvesting structure		
2.	Structure 2	Tank/lake/harvesting structure		
3.	Structure 3	Tank/lake/harvesting structure		
4.	Structure 4	Tank/lake/harvesting structure		
5.	Structure 5	Tank/lake/harvesting structure		
6.	Structure 6	Tank/lake/harvesting structure		
7.	Structure 7	Tank/lake/harvesting structure		
8.	Structure 8	Tank/lake/harvesting structure		
9.	Structure 9	Tank/lake/harvesting structure		
Total		Total		

5. Status of Surface water bodies in the Village

Table 8 - Village Surface water body status (10 points)

S. No.		YES (2)	NO (0)
1.	Is the water body Recharged by any fresh water stream?		
2.	Does the water body contain any fish?		
3.	Does the water body have floating solid waste?		
4.	Does the sewage/used water enter the water body?		
5.	Is the water body being encroached?		

Table 9: Drinking water quality

	Drinking Water Quality and Monitoring (10 points)		
S No	**Criteria**	**Max Points**	**Scored**
	Water Quality	**10**	
21.	Is the well water potable?		
22.	Is the hand pump water potable?		
23.	Is the bore well water potable ?		
24.	Is the over head tank water potable?		
25.	Is the community water supply water potable?		
26.	Is it safe to drink water without purification?		
27.	Do you get turbid water or foul smelling water from the supply line?		
28.	Is it safe to drink tap water after purification?		
29.	Is supply water is chlorinated?		
30.	Is water purification plant in the village?		
	Total		

Table 10: Monitoring and Management

	Monitoring and Management (13 points)		
S No	**Criteria**	**Points**	**Scored**
14.	Has the village installed water use meters at all bulk water dispensing locations and tanks?	13	
15.	Does the village monitor the water use meter every day?		
16.	Has the village installed flow meters at all bulk water dispensing locations and tanks?		
17.	Does the village measure the amount of ground water drawn on a daily basis?		
18.	Does the village measure per minute pump-wise flow of water?		
19.	Does the village monitor number of hours the water pump is switched on?		
20.	Does the village measure the flow of water every time the motor runs to understand withdrawal of water?		
21.	Does the village conduct water audit every day?		
22.	Does the village prepare water budget?		
23.	Does the village monitor the difference in levels of water in the overhead tank beginning of the day?		

24.	Do the village officials check the difference in levels of water in the overhead tank by the end of the day?		
25.	Does the village official ensure that the tanks are full beginning of each day?		
26.	Does the village estimate the consumption of water by end of the day?		
	Total		

Table 11 : Water Conservation

Water Conservation (20 points)			
S No	**Criteria**	**Max Points**	**Scored**
	Functional taps without leakage in the individual household toilets and other places in the village	**5**	
21.	Availability of functional taps (all points of use) in the individual household toilets, bath areas, community toilets, anganwadis, panchayat office or other places in the village		
22.	Availability of functional taps excluding household and community toilets and bath areas in the village– gardens, public areas		
23.	Are leaking taps reported immediately? Frequency of taps replacement		
24.	Investing on good quality taps (rust-proof, PVC). Tap Inspectors – frequency of visits		
25.	Do pipe leakages get immediate attention?		
	Network of water pipelines – inspection and observation for leakages	**2**	
26.	Weekly checking of water pipelines for leaks		
27.	Hygiene maintenance in water pipeline areas		
	Leakages impacting roofs and sidewalls in community buildings	**3**	
28.	Identification of leaking points on roofs and sidewalls		
29.	Experts/Engineers' Inspection and advice on impact of leaking roofs and sidewalls		
30.	Weekly repairs/ maintenance of leaking roofs & sidewalls		
	Feedback mechanism	**3**	
31.	Availability of feedback mechanism in all village community buildings for review		
32.	Periodic review of leaking taps, and plumbing fixtures from village residents		
33.	Assessing and implementing the complaints/suggestions received from village residents		
	Water Efficient Toilets in individual households and community		

	Toilets equipped with dual flush system		
34.	Flush tank has dual flush and efficient less than 6 ltrs	**4**	
35.	Flush tank has dual flush but inefficient more than 6 ltrs		
36.	Flush tank has single flush and efficient less than 6 ltrs		
37.	Flush tank has single flush but inefficient more than 6 ltrs		
	Taps – sensor based or time		
38.	Timed efficiently	**2**	
39.	Timed not so efficiently		
	Availability of Recycled Water for Toilets		
40.	Recycled water is available and has connected network	**1**	

Table 12 : Plantation

Plantation (15 points)		Max Points	Scored
S No	**Criteria**		
1.	Area under green cover	6	
2.	Water efficient community plantation		
3.	Plant Protection Management		
	Total		
	Total land area occupied (3 points)		
	Land Area	**Area in Square metres**	
1.	Constructed area		
2.	Green area in the village		
3.	Unconstructed barren area		
	Total land area		
	Village Initiatives (4 points)	**Max Points**	**Scored**
1.	Allocation of designated land area/place for plantation	4	
2.	Maintenance of plantation and water conservation activities		
3.	Water conservation community program		
4.	Strategies for community plantation		

	Total		
Plant Protection and Plantation Management (5 points)			
5.	Planting less water intensive plants , Planting less water intensive garden	5	
6.	Plant support with bio fertilizers and water support		
7.	Replacement plan for plantation		
8.	Controlled Bio pesticide administration		
9.	Drip irrigation		
	Total		

Table 13: Recycling in Village

	Recycling (30 points)	Max(3)	Score
11.	Is Sampling and analysis of wastewater done periodically?		
12.	Is there a plan for recycling wastewater in the village?		
13.	Is there a method for collection of used water for recycling?		
14.	Is grey water or non recycled water used for any purpose?		
15.	Is recycled water used for village agriculture purposes?		
16.	Is the recycling equipment well maintained?		
17.	Is the wastewater collected daily, weekly, monthly, annually?		
18.	Is the collected wastewater recycled daily, weekly, monthly, and annually?		
19.	What is the percentage of wastewater recycled?		
20.	Is wastewater of RO of public buildings used for other purpose?		

Administration (20 points)			
S No	**Criteria**	**Max Points**	**Scored**
	Dedicated Staff for Water Maintenance		
1.	Availability of adequate staff - men and women for maintenance Is any village representative allotted the task of monitoring all water issues?		
2.	Is sufficient cleaning staff available? If required enquire about working conditions from village residents members to ascertain workload and training		
3.	Is there job rotation for maintenance staff?		
4.	Is the staff motivated in maintaining a water smart village?		
	Plugging Leakages	2	
1.	Do you have area-wise water watching team which stops the water wastage?		
2.	Do you adopt a method of geo tagging the water leaking points and app-based alerts of the plumbers in the village to arrest water leakages and water stagnation-related challenges?		
	Training provided	**2**	
1.	Is the staff identified with sufficient training and equipment to conduct their duties satisfactorily?		
2.	Is the training holistic, covering all the tasks in the village?		
	Random verification of reports by village representatives	**1**	
	Does the representative conduct random checks to ensure smooth running of maintenance operations?		
	Reporting of inadequate facilities and mechanism for repairs	**5**	
1.	Is there a suggestion mechanism in place: eg suggestion box/ complaint register/ intranet group/contribution offer register/whatsapp group?		
2.	Is this checked daily/weekly?		
3.	Is there a complaint redressal team for Hygiene maintenance issues?		
4.	Are staff complaints/concerns redressed through the same mechanism?		
5.	Are suggestions given by maintenance staff considered for improvement of Maintenance Cycle?		
	Formats for daily / weekly / monthly inspections and reports	**6**	
1.	Are inspection records maintained diligently?		
2.	Are the random inspections done by representatives judiciously?		
3.	Are the formats easy to fill, and comprehensive?		
4.	Is there a scope for adding notes in the report?		
5.	Do reports include contribution offers, suggestions and complaints received by users?		
6.	Does the senior staff conduct random checks to ensure smooth running of maintenance operations?		
	Total	**20**	

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Where there is Rural Wellbeing there is Universal Prosperity

040 - 2321 2120

admin@mgncre.in
www.mgncre.in

#5-10-174, Shakkar Bhavan, Fateh Maidan Lane,
Band Colony, Basheer Bagh,
Hyderabad-500004