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CENTURION UNIVERSITY OF TECHNOLOGY & MANAGEMENT, ODISHA

Technical Report on Rainwater harvesting at CUTM

1. Rain Water Harvesting:

Centurion University of Technology and Management (CUTM) is one of the fastest emerging university comprising four campuses spread all over Odisha, a state in Eastern part of India. This region is bestowed with an annual rainfall ranging from 1600 to 2000 mm and two-third of which occurs during monsoon season spanning from June to September. About 50% of this rainfall occurs through a few intense storms. The spatial heterogeneity and temporal variability of rainfall leads to differential surface flooding, runoff, erosion and nutrient losses during monsoon season and water scarcity during non-monsoon season. Owing to optimum interaction and synergetic effect of land and water resources over the period of time rain water harvesting and its utilization for irrigation, rearing fish and ground water recharge have become the popular programmes among the various University developmental programmes across all the CUTM campuses.

CUTM is implementing various rain water harvesting structure to improve water supply to agriculture fields and enhance the ground water recharge across all the campuses. It is also bringing enhance learning to students regarding various water harvesting structures.

The rain water coming from roof tops of the buildings, paved streets, parking lots, sidewalks and other areas are collected in storage tank/percolation ponds or diverted to the recharge pits for ground water recharge.

The different rainwater harvesting structures available in CUTM campuses are given below.

1. **Borewell recharge:**

Borewell recharging technically focuses on the use of harvested surface rainwater pass through a filter made up of gravels, then through another layer of sand and finally through a fine mesh wrapped around

the drilled casing pipe into the borewell. The fine mesh ensures the removal of big and tiny impurities before the water enters the borewell.

CUTM Bhubaneswar campus is facilitated with four borewell recharge pits to augment the groundwater. Following Steps are followed for construction of Borewell recharge pits:

- Percolation pit is dug around the tube well's casing pipe.
- This casing pipe is then perforated with a drill machine and the holes are covered by a nylon mesh to ensures only water can enter borewell.
- The empty area between the pit walls and tube well casing is then filled with filtering materials i.e. sand, gravels and crushed stone.
- The rain water from adjacent roof top of different buildings is diverted into this well which gets filtered and then continue to seep into the casing pipe, thus refilling the bore well.

The Details of the Borewell recharge pits are given in the following table:

Pit No.	**Location of Point**	**Source of Water**	**Depth of the Borewell (ft)**
Pit No -1	Boys Hostel	From the rooftop of Boys Hostel	400
Pit No -2	Workshops	From the rooftop of Workshops	150
Pit No -3	Advanced Skill Centre	From the rooftop of Advanced Skill Centre	260
Pit No -4	Staff Quarter	From the rooftop of Staff Quarters	280

Estimated annual water Recharge potential through these Borewell is about 8000 cu.m.

2. Percolation Pond:

Percolation pond is an artificially created surface water body, submerging in its reservoir a highly permeable land so that surface runoff is made to percolate and recharge the ground water storage.

The CUTM Paralakhemundi campus has six Percolation ponds constructed on second and third order streams, located on highly fractured and weathered rocks having lateral continuity downstream. The recharged area downstream has 17 number of tubewells and cultivable land benefiting from the augmented ground water.

A small loose boulder check dam (10 m long and 2 m height) was constructed at the vicinity of the campus to check the velocity of runoff generated from the mountain present nearby the campus. Apart from this, Staggered trenches and land bundings were also done in 5 acres land near tribal village for in-situ rainwater conservation.

The dimensions and capacity of each percolations ponds at CUTM campuses are given below:

Pond No.	Location	Length (m)	Width (m)	Area (m^2)	Depth (m)	Total Capacity (m^3)
	Paralakhemundi Campus:					
1	Near STP No. 4	73.2	39.6	2900	1.9	5509.8
2	Opposite to VC Bungalow	21.0	19	399	1.8	718.2
3	Tribal Village	27.0	15	405	1.5	607.5
4	Near FMP lab	81.0	21.2	1717	1.5	2575.8
5	Near MBA building	27.0	10.8	292	3	874.8
6*	Near Cowshed	56.0	37.5	2100	5	10500
					Total	**20786.1**

*Currently this pond is Polythene lined (May 2022) and used for fish rearing.

Paralakhemundi campus has six percolation ponds of different dimensions for collection of runoff water generated within the campus area. Total water storing capacity of these ponds is about 20786.1 cu.m.

The dimensions and capacity of percolations tanks at **CUTM Bhubaneswar** campuses is given below.

Pond No.	Area of pond (sq.m)	Depth (m)	Capacity of the pond (m^3)	Source of Water
1	11255	12	135060	Rainwater (Rooftop and Surface runoff) and STP Treated water

The water from this tank is also used for gardening, floor cleaning and other external uses apart from ground water recharge.

Percolation tank details of **Rayagada Campus**:

Pond No.	Length (m)	Width (m)	Depth (m)	Capacity of the tank (m^3)	Source of rain Water	Water Recharged annually (lit.)
1	10	7.6	2.5	190	Rainwater (Rooftop and Surface runoff)	47340

CUTM Paralakhemundi campus under the School of Fisheries a 10-acre fish farm at Totagumuda village comprises 23 earthen ponds of different dimensions having 25241 cu.m of total water storing capacity. These ponds are used for fish rearing and also contributing the groundwater recharge at the same time.

The dimensions and capacity of these ponds are given below:

Pond No.	Size (Length x width x depth) (m)	Pond Capacity (m^3)	Source of water	Purpose of pond
1.	26 x 21 x 2	1092	Bore well and canal water	Stoking pond for IMC
2.	21 × 31 x 2	1302	Bore well and canal water	Stocking pond for IMC
3.	21 x 25 x 2	1050	Bore well and canal water	Stocking pond for IMC
4.	18 x 15 x 1	270	Bore well and canal water	Nursery pond for pangas
5.	19 x 10 x 1	190	Bore well and canal water	Nursery pond for clarius
6.	21 x 9 x 1	189	Bore well and canal water	Nursery pond for murrel
7.	20 x 11 x 1	220	Bore well and canal water	Nursery pond for murrel
8.	18 x 20 x 1	360	Bore well and canal water	Nursery pond for pangas
9.	25 x 39 x 1.5	1462.5	Bore well and canal water	Rearing pond for amur, silver and grass carp
10.	18 x 19 x 1.5	513	Bore well and canal water	Rearing pond for IMC
11.	21 x21 x 1.5	661.5	Bore well and canal water	Rearing pond for IMC
12.	22 x 22 x 1.5	726	Bore well and canal water	Rearing pond for Gonionotus and mrigal
13.	15 x 22 x 1.5	495	Bore well and canal water	Rearing pond for Gonionotus and mrigal
14.	16 x 21 x 1.5	504	Bore well and canal water	Rearing pond for Gonionotus and mrigal
15.	14 x 20 x 1.5	420	Bore well and canal water	Rearing pond for Gonionotus and mrigal
16.	13 x 22 x 1.5	429	Bore well and canal water	Rearing pond for Pacu
17.	17 x 22 x 1.5	561	Bore well and canal water	Rearing pond for Pacu
18.	16 x 20 x 1.5	480	Bore well and canal water	Rearing pond for Pacu
19.	21 x 22 x 1.5	693	Bore well and canal water	Rearing pond for Pacu
20.	35 x 14 x 1.5	735	Bore well and canal water	Broodstock pond for catla,rohu,prawn
21.	38 x 22 x 2	1672	Bore well and canal water	Broodstock pond for EMC
22.	77 X 44 X 2	6776	Bore well and canal water	Broodstock pond for EMC
23.	48 x 37 x 2.5	4440	Rain Water	IMC Brooders
	Total Capacity	**25241**		