

# **ASSIGNMENT BOOKLET**

## **Certificate in Water Harvesting and Management (CWHM)**

**(Assignment for the January  
and July Session 2018)**

**Note:** First of all read the assignment/questions and instructions carefully and identify the components of an assignment. You should read the relevant sections and sub-sections of a unit while preparing your responses and write answers in your own words. Your responses should not be a verbatim reproduction of the textual materials/blocks provided for self-learning purposes. We also suggest that, you may read additional materials available in your study centre or in any other library before preparing your responses. But extra reading is not a must to answer these assignments.



**School of Agriculture  
Indira Gandhi National Open University  
New Delhi -110068  
2018**

Dear Learner,

Welcome to the Certificate in Water Harvesting and Management (CWHM) programme.

We hope that you have gone through the Programme Guide for CWHM carefully. It is extremely important to complete the assignments within the stipulated time to be eligible to appear for the term-end examination. All the assignments of CWHM are Tutor Marked Assignments (TMAs) and are part of the continuous evaluation process.

Before you write the assignments, read the instructions provided in the Programme Guide carefully and go through the course materials. If you have any doubts or problems pertaining to the courses and assignments, contact the concerned academic counsellor at your Study Centre. If you still have problems, do feel free to contact us at the School of Agriculture.

You are requested to go through the course material first and then complete the assignments. Your answers should not be a verbatim reproduction of the textual materials/blocks provided for self-learning purposes. On top of the first page of your answer sheet, please write the details exactly in the following format.

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Enrollment no:.....  
Name:.....  
Address:.....  
.....  
.....

Course Code:.....  
Course Title:.....  
Study Centre:..... Date:.....  
(Name and Code)

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**Please submit your assignments at the Study Centre allotted to you before the due date as mentioned below:**

Course Code	Last Date for January 2018 Session	For July 2018 Session
ONR-001	31 <sup>st</sup> January 2018	31 <sup>st</sup> July 2018
ONR-002	28 <sup>th</sup> February 2018	30 <sup>th</sup> August 2018
ONR-003	25 <sup>th</sup> March 2018	25 <sup>th</sup> September 2018

We suggest that you should retain a copy of your assignment responses.

Wish you all good luck for successful completion of the programme.

**Note:** Minimum 35% marks in Continuous Assessment i.e., each assignment in each course is required for completion of a course for CWHM programme.

*School of Agriculture  
Indira Gandhi National Open University,  
Maidan Garhi, New Delhi-110068, India.*

**Assignment -1**  
**Course Code: ONR-001**

**Maximum marks: 50**

**Answer the following questions. All questions carry equal marks.**

1.	(a) Define rainwater harvesting. Discuss why it is important in urban areas? (b) Define irrigation efficiency and irrigation intensity. How it can be improved in Indian conditions?	5 5
2.	(a) Explain irrigation always has found an important place in overall development of agriculture. (b) How groundwater plays an important role in irrigation in India?	5 5
3.	(a) Define water pollution? Differentiate between surface water and subsurface water pollution? (b) What is roof top rainwater harvesting? Discuss advantages of roof top rainwater harvesting.	5 5
4.	(a) What is watershed management? Explain important components of watershed management. (b) Discuss the importance of bottom up approach in effective implementation of watershed development projects in India.	5 5
5.	(a) What is project implementation agency? Describe its important functions. (b) Explain institutional arrangement of watershed projects in the India with the help of a flow diagram.	5 5

**Assignment - 2**  
**Course Code: ONR-002**

**Maximum marks: 50**

**Answer the following questions. All questions carry equal marks.**

1.	(a) Explain the significance of Intensity- Duration- Frequency Analysis. (b) Define runoff. Explain the climatic and physiographic factors affect the runoff rate and volume.	5 5
2.	(a) Differentiate between convective and cyclonic rainfall with the help of diagram. (b) Explain weighing bucket type of rain gauge.	5 5
3.	(a) Differentiate between evaporation and evapotranspiration. List the different factors affecting evaporation. (b) What is water balance? Write water budget equation and explain its different components.	5 5

4.	(a) Calculate the average rainfall from 200 km <sup>2</sup> area using the data given below:					5	
	Station	1	2	3	4		5
	Rainfall, mm	25	32	65	45		57
	Area of Polygon, km <sup>2</sup>	20	65	30	50		35
	(b) Discuss in detail the rational method for runoff rate estimation.					5	
5.	(a) A stream of 25 m <sup>3</sup> /sec discharge has pollutant concentration of 400 ppm (mg/l). The effluent from an industry is discharged into the stream at the rate of 2.0 m <sup>3</sup> /sec with a concentration of 20000 ppm. Compute the resultant concentration.					5	
	(b) What is disinfection? Explain in detail the conventional water treatment plant.					5	

**Assignment – 3**  
**Course Code: ONR-003**

**Maximum marks: 50**

**Answer the following questions. All questions carry equal marks**

1.	(a) Discuss the importance of water harvesting for agriculture in India.	5
	(b) Describe importance of ITK in water harvesting. Explain any two ITK used in Rajasthan.	5
2.	(a) Differentiate between <i>in-situ</i> and surface water harvesting?	5
	(b) What are the different types of catchments surfaces from where the rainwater can be harvested, explain?	5
3.	(a) Discuss in detail roof top rainwater harvesting.	5
	(b) A farmer applying 6 cm irrigation to 10 ha area and meeting water requirement of 20 cows and of 10 buffalos. Assume requirement of cow and buffalos are 70 and 60 litres/ day. Compute the gross storage capacity of a water storage pond to meet the water need for 30 days.	5
4.	Discuss the different method of irrigation. Explain why drip irrigation is suitable in the area of water scarcity.	10
5.	(a) What is artificial groundwater recharge? List advantages and disadvantages of groundwater recharge?	5
	(b) Define seepage. Discuss the role of lining materials for controlling seepage losses?	5