

NSQF QUALIFICATION FILE

CONTACT DETAILS OF THE BODY SUBMITTING THE QUALIFICATION FILE

Name and address of submitting body:

Ministry of Environment, Forest & Climate Change (MoEF&CC)
Indira Paryavaran Bhawan, Jor Bagh Road, New Delhi- 110003

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List of documents submitted in support of the Qualification File

- 1. Curriculum with training plan (Annexure I)**
- 2. Documentary Evidence of Need (Annexure II)**

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1	Qualification Title	Certificate Course in Water Budgeting and Auditing
2	Qualification Code, if any	-
3	NCO code and occupation	-
4	Nature and purpose of the qualification (Please specify whether qualification is short term or long term)	<p>Nature of Qualification: Certificate Course in Water Budgeting and Auditing</p> <p>Purpose of Qualification: Water demand has reached scarcity proportion in some areas while others are severely water stressed. Newer sources of fresh water are difficult to come by, forcing to relook at our exiting water resources, water supply systems and current water use efficiencies in various sectors. Sustainable water use demands that we look as treated waste water as resource. This means that strategies for water audit and assessment of water demand is justified. This course is designed to equip trainees with such kind of knowledge and skills. The course will also look at recent water audit initiatives and guidelines from governing bodies.</p> <p>Short Term</p>
5	Body/bodies which will award the qualification	MoEF&CC
6	Body which will accredit providers to offer courses leading to the qualification	MoEF&CC
7	Whether accreditation/affiliation norms are already in place or not , if applicable (if yes, attach a copy)	<p>Training programmes would be undertaken as part of the Green Skill Development Programme (GSDP) under the ENVIS Scheme. The courses would be run by the ENVIS Hubs (hosted by the respective State Government /UT Administration) and ENVIS Resource Partners (RPs)- (hosted by environment-related governmental and non-governmental organizations/ institutes of professional excellence) and other institutes. The assessment of the training programmes would be a regular exercise as part of the Memorandum of Cooperation signed with ENVIS Hubs and RPs and Memorandum of Understanding (MoU) between the ENVIS Hubs/RPs and other GSDP Partners. The</p>

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		courses would also be run by the Autonomous Bodies/Institutes under the Ministry for which no MoC is required.
8	Occupation(s) to which the qualification gives access	Water auditor
9	Job description of the occupation	Water auditors would be able to assess current usage of water (withdrawal, supply-demand) across various sectors to control abuses of water and achieve efficiency in water saving. They would also be able to systematically review the sites to detect the quantities and characteristics of all water use and provide technical support to prevent loss and abuse of water.
10	Licensing requirements	NA
11	Statutory and Regulatory requirement of the relevant sector (documentary evidence to be provided)	NA
12	Level of the qualification in the NSQF	Level 6
13	Anticipated volume of training/learning required to complete the qualification	200 hours
14	Indicative list of training tools required to deliver this qualification	Training materials, books, reference documents, access to computer lab, relevant software, tool kit.
15	Entry requirements and/or recommendations and minimum age	Graduate Age Limit: above 21 Years
16	Progression from the qualification (Please show Professional and academic progression)	Water Management Expert/Master Trainer
17	Arrangements for the Recognition of Prior learning (RPL)	There is no arrangement of RPL as of now
18	International comparability where known (research evidence to be provided)	Similar Course is being offered in other developing and developed countries.
19	Date of planned review of the qualification.	March 2020

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20	Formal structure of the qualification		
	Mandatory components		
	Title of component and identification code/NOSs/Learning outcomes	Estimated size (learning hours)	Level
(i)	Introduction and basic concepts	15	
(ii)	Water conservation practices	20	
(iii)	Water audit and computer based applications	40	
(iv)	Water audit for sectors	35	
(v)	Present water related practices and its required interventions	20	
(vi)	Case study analysis	20	
(vii)	Field training	50	
	Sub Total (A)	200	6
	Optional components		
	Title of component and identification code/NOSs/ Learning outcomes	Estimated size (learning hours)	Level
		NA	NA
	Sub Total (B)		
Total (A+B)		200	6

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SECTION 1 ASSESSMENT

21	<p>Body/Bodies which will carry out assessment:</p> <p>The assessments will be carried out by the evaluators of Asian Development Research Institute (ADRI), Patna and Environment Protection Training and Research Institute (EPTRI), Hyderabad. These evaluators would be chosen from the panel of experts who are not part of the trainers. Based on the evaluation, certificates will be issued.</p>
22	<p>How will RPL assessment be managed and who will carry it out?</p> <p>No RPL in this programme</p>
23	<p>Describe the overall assessment strategy and specific arrangements which have been put in place to ensure that assessment is always valid, reliable and fair and show that these are in line with the requirements of the NSQF.</p> <p>The assessment will be done through assignment evaluation, theory and practical exams with viva-voce. The evaluation will have a weightage to the relevant presentation after end of each module in the class room.</p> <p>For practical examination, the trainers as well as course supervisors will constantly keep a vigil on the trainees. Any errors committed by the trainees will be corrected then and there; a learning by doing technique will be adopted for practical assessment.</p> <p>In theory, a final examination will be conducted at the end of the course, in which 50% scoring will be considered to be as qualifying marks. The Assessments will be conducted through English/Hindi Questionnaires. However, the Invigilators (not Trainers/Supervisors) will be empowered to explain/translate the question to the trainees in their regional language, if required. The trainers will not be involved in the assessment, whatsoever, at any point.</p> <p>The assessment will have components of English language compatibility which would have 5% weightage in the end module.</p>

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ASSESSMENT EVIDENCE

24. Assessment evidences

Title of Component: Water Budgeting & Auditing

Outcomes to be assessed/NOSs to be assessed	Assessment criteria for the outcome
<p>1. Introduction and basic concepts</p> <p>The trainee will be able to describe</p> <ul style="list-style-type: none">- water demand management concepts including techniques to assess water demand for various sectors	Evaluation test (Theory)
<p>2. Water conservation practices</p> <p>The trainee will be able to describe</p> <ul style="list-style-type: none">- Basics of water conservation, water conservation techniques, institutional and policy aspects of water conservation.	Evaluation test (Theory)
<p>3. Water audit and computer based applications</p> <p>The trainee will be able to describe</p> <ul style="list-style-type: none">- Steps of water audit, water supply and usage study, process study, discharge analysis, water audit report, benefits of water audit. <p>The trainee will be able to analyse real world cases with the help of water audit</p>	Evaluation test (Theory and practical)

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software.	
<p>4. Water audit for Sectors</p> <p>The trainee will be able to describe</p> <ul style="list-style-type: none"> - Steps of water audit, water supply and usage study, process study, discharge analysis, water audit report, benefits of water audit. - The trainee will be able to analyse real world cases with the help of water audit software. 	Evaluation test (Theory)
<p>5. Present water related practices and its required interventions</p> <p>The trainee will be able to - -</p> <ul style="list-style-type: none"> - identify the loop holes in the current water practices and the create awareness of the precise water usage through suggestive interventions and case study analysis 	Evaluation test (Practical)
<p>6. Case Study Analysis</p> <p>The trainee will be able to describe</p> <ul style="list-style-type: none"> - the best practices of water management around the world and traditional water management options that are stratified by different communities. 	Evaluation test (Theory)
<p>7. Field Training</p> <p>The trainee will be able to</p> <ul style="list-style-type: none"> - perform Individual Water Audit and document the findings 	Evaluation test (Practical)
<p>Means of assessment 1</p> <p>Theory and Practical exam on field and through Viva-voce</p>	

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Means of assessment 2

Evaluation test based on a set of subjective and objective questions and practical tests for selected modules.

Pass/Fail. The pass mark for Theory exam (Multiple Choice Questionnaire) will be 50 out of 100. In Practical, 75 marks for Practical exam and 25 marks for viva-voce. Pass mark will be 50 marks but in Practical exam Trainee should score at least 40 marks out of 75.

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SECTION 2

25. EVIDENCE OF LEVEL

OPTION A

Title/Name of qualification/component: Certificate Course in Water Budgeting & Auditing			Level: 6
NSQF Domain	Outcomes of the Qualification/Component	How the outcomes relates to the NSQF level descriptors	NSQF Level
Process	The trainees will get a comprehensive understanding of all aspects of water auditing and budgeting methodologies. They will be able to describe the underpinning basic concepts in the water management, the causes and the effects/impacts of unsustainable water management practices and how better sustainable modules can be of straightedge. Through field demonstrative practical exercises, literature review and case study analysis, trainees will have an opportunity to get in-depth hands on experience of water auditing in a particular chosen area.	Water auditors will have the comprehensive knowledge of water management and skills to identify the areas of intervention and their methods in practical scenario. They will also have clear understanding of how water management practices varies across different sectors and also will have the skill to select appropriate measure to counter them in respective sectors.	6
Professional knowledge	The trainees will have clear understanding of the requirements of water budgeting and auditing on the basis of sectorial water supply-demand analysis, future projection of water supply and demand, principles and techniques of water conservation, catchment planning and watershed management. They will also gain knowledge on	Trainees will have factual knowledge of available water resources as well as techniques to assess water demand for various sectors. They will have knowledge of principles and techniques of water conservation, water auditing sector wise. Case study analysis through short videos, area specific presentations, on ground practitioners	6

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NSQF Domain	Outcomes of the Qualification/Component	How the outcomes relates to the NSQF level descriptors	NSQF Level
	steps of water audit, water supply and usage study, process study, discharge analysis, water audit report, benefits of water audit. They will gain technical knowledge on the water audit softwares like PODIUMSim, AWWA softwares, IWMI softwares, SCADA, smart cities and smart water networks, leak detection and management methods.	view point, the trainees will develop practical know-hows in the relevant fields.	
Professional skill	The trainees will be able to create field based repository of current water practices to identify the loop holes and create awareness of the precise water usage through suggestive interventions and case study analysis. Individual exercise on water audit will train them to conduct entire water auditing task independently, from identifying the problem to actually come to a solution of the problem in a technically efficient way. They will be able to design and implement a water efficiency program at the facility.	As the job would require practical skill and knowledge to accomplish the task of water auditor and solve problems applying knowledge gained during the course, therefore it matches with level 6 descriptor. The course will have sync with the National Water Mission which will further facilitate and engage the water auditors and budgeters to assist in Annual State Water Budgeting (to be undertaken annually), monitoring of the development and use of Water resources at State level including measurement at Supply and Demand side and strict monitoring of Quality and fixation of accountability, preparation of contingency plan to address Climate Change impact on Water and State Specific Action Plan on Water Sector (SSAP) on	6

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Title/Name of qualification/component: Certificate Course in Water Budgeting & Auditing			Level: 6
NSQF Domain	Outcomes of the Qualification/Component	How the outcomes relates to the NSQF level descriptors	NSQF Level
		Water Security, Safety and Sustainability till 2050.	
Core skill	Independent water audit will allow trainees to conduct a rapid visual survey namely inspection of the facility, a review of base maps of buildings(s) including the GIS Shape layer files and an extensive site investigation to verify information. The process will involve information collection, feeding in to models and mathematically analyse the output to develop a strategy for efficient water management.	The trainees will develop undergo the exercise of data collection, organizing database, mathematically solve a problem using water auditing software and ultimately presenting in front of evaluator for assessment.	6
Responsibility	Water auditors will be able to independently handle water audit as an efficient water management tool for water conservation, provide solutions for sustainable water management which has positive environmental, social and economic benefits. They will be able to assess current water usage practices and its required interventions in different sectors. They are able to determine the amount of unaccounted-for water and check abuses.	The modules cover the entire domain of water management with respect to water budgeting and auditing and also train them to work independently after the successful completion of the course. The certified trainees will be able to take the responsibility of their work. They may also undertake responsibility for other's works as Master Trainer.	6

**SECTION 3
EVIDENCE OF NEED**

26	What evidence is there that the qualification is needed? What is the estimated uptake of this qualification and what is the basis of this estimate?	
	Basis	In case of other Awarding Bodies (Institutes under Central Ministries and states departments)
	Need of the qualification	<p>Booming economics, population growth and rapid urbanization have considerable impact on India's water demand. While, as per the international norms, countries with per-capita water availability less than 1700 m³ per year is categorized as water stressed, with per capita available water of 1545 m³ (Census, 2011), India is definitely a water stressed country. The projected per capita water availability to reduce to 1401 m³ and 1191 m³ by the years 2025 and 2050 respectively and eventually India is likely to become a water scarce country. According to projections by National Commission on Integrated Water Resources Development (NCIWRD), the irrigation sector alone is going to need additional 71 bcm by 2025 and 250 bcm of water by 2050 compared to the demands of 2010.</p> <p>Therefore, it is essential to assess current usage of water (withdrawal, supply-demand) across various sectors to control abuses of water and achieve efficiency in water saving. Systematic and regular review of sites can detect the quantities and characteristics of all water use. There lies the importance of the qualification. Supporting research articles and documents are attached.</p>
	Industry Relevance	The curriculum/course syllabus has been jointly prepared by the Scientists/Experts in the institutions/Govt. Departments viz. ADRI, Patna and EPTRI, Hyderabad, undertaking the course in their respective locations.
Usage of the qualification	This course has been designed under GSDP for the first time.	

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	Estimated uptake	An uptake of 25-30 students is envisaged.
27	Recommendation from the concerned Line Ministry of the Government/Regulatory Body. To be supported by documentary evidences NA	
28	What steps were taken to ensure that the qualification(s) does (do) not duplicate already existing or planned qualifications in the NSQF? Give justification for presenting a duplicate qualification National Qualifications Register was searched to assess if there was any similar qualification programme initiated in this field and no overlap was found with the existing qualifications.	
29	What arrangements are in place to monitor and review the qualification(s)? What data will be used and at what point will the qualification(s) be revised or updated? Specify the review process here Feedback would be taken from experts, students and teachers regarding the course content, structure and timeline of the programme. Feedback will also be taken from the Centres conducting the course. Changes suggested will be assessed by the Ministry before incorporating them in the curriculum. Next review will be done in March 2020.	

SECTION 4

EVIDENCE OF PROGRESSION

30	What steps have been taken in the design of this or other qualifications to ensure that there is a clear path to other qualifications in this sector? <i>Show the career map here to reflect the clear progression</i> The course is designed to equip students with knowledge and skills of water auditing and budgeting methodologies. The course will also look at recent water audit initiatives and guidelines from governing bodies. Water Auditor ---- Water Management Expert/Master Trainer	
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Curriculum with training plan

S. No.	Topics	Estimated Size (Learning Hours)
1.	<p>Introduction and basic concepts</p> <p>Protected water supply, estimation of water demand for agricultural, domestic and industrial sectors-factors affecting variation in demand, constraints. Projections for future demands, additional demand management through treated waste water and efficient storm water management. Existing sources of fresh water, intake structures, conveyance of water.</p>	15
2.	<p>Water conservation practices</p> <p>Water conservation as a measure to meet future water demands Conjunctive water use, rain water harvesting techniques, catchment planning, watershed management, institutional and policy aspects with creating and understanding of the traditional practices.</p>	20
3.	<p>Water audit and computer based applications</p> <p>Steps of water audit, water supply and usage study, process study, discharge analysis, water audit report, benefits of water audit. Introduction to water audit software like PODIUMSim, AWWA software, IWMI software, SCADA, smart cities and smart water networks, leak detection and management methods. Advanced module would cater one software based application training and module with field projects</p>	40
4.	<p>Water audit for Sectors</p> <p>This module is aimed to provide a basic framework for understanding the sectorial water demand in three major sectors (i) Irrigation (ii) Domestic and (iii) Industry.</p> <p>The brief outlines for sectorial water auditing aspects are as follows:</p> <ul style="list-style-type: none"> • Water audit for irrigation - Water demand, irrigation efficiencies, field application efficiency, conveyance efficiency, irrigation challenges, use of more efficient techniques of irrigation and their implementation. • Water audit for domestic sector - Per capita water requirement, assessment of losses in water supply system, identification of losses at source, reduction of water requirement at source, water reuse and 	35

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	<p>recycling. 20</p> <ul style="list-style-type: none"> Water audit for industrial sector: Types of industries in India, generation and estimation of water use, audit of the various processes within the industry using water, reduction in water losses, generation and estimation of waste water at various processes in industrial production, estimation of pollution load, treatment facilities available at industry, concept of zero liquid discharge, quantity of water recycled in industry, incentives, policies and implementation. 	
5.	<p>Present water related practices and its required interventions</p> <p>This module will be field based repository creation for the current water practices to identify the loop holes and the create awareness of the precise water usage through suggestive interventions and case study analysis.</p>	20
6.	<p>Case Study Analysis</p> <p>This module will cater the case study analysis through short videos, area specific presentations, on ground practitioners view point etc. This subsection will be made to record, understand and archive the traditional water management options that are stratified by different communities.</p>	20
7.	<p>Field Training</p> <p>The field training will objectify the modalities of synergising the appetite of the water demand both in perspective of the actual demand and virtual water footprint</p>	50
Total		200