



# Water Matters for India

The Young Water Professionals Program  
Resource Book



## About the authors

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Western Sydney University supports the Sustainable Development Goals

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# 1 Welcome and Foreword

Australia and India have deep policy and technical cooperation in the area of integrated water resources management. This bilateral relationship began in 2009 through a formal Memorandum of Understanding between the Australian Government Department of Agriculture and Water Resources (now the Department of Agriculture, Water and the Environment) and the Government of India's Ministry of Water Resources (now Ministry of Jal Shakti) to share knowledge and experience in managing water resources.

India is facing a set of severe water challenges, with demand for fresh water expected to exceed supply by 50% before 2030 unless major water management reforms are undertaken. These challenges, combined with the fact that half of India's population is under 25 years old, demonstrate that investing in the next generation of water leaders is essential, and urgent.

Through the Australian Water Partnership (AWP), Australia is working with India to address these water challenges—engaging primarily with the Government of India Ministry of Jal Shakti through the National Hydrology Project (NHP). The AWP is a water for development partnership supported by the Australian Government Department of Foreign Affairs and Trade. AWP mobilises Australia's internationally recognised expertise in water management to meet the vital water resource management needs of developing countries primarily in the Indo-Pacific, drawing on water expertise from over 220 Australian partners.

Since its inception in 2015, AWP has supported technical assistance projects to strengthen water resources management in some 30 countries. It was recognised that to deliver the NHP's strategies, critical enablers are the technical and leadership competencies of its people and their continuous development. In response, AWP is supporting a Young Water Professionals (YWP) Program in India.

The India YWP Program aims to provide structured capacity development training with strategic and long-term investment to support water management reforms in India. AWP has successfully pioneered similar programs in South-East Asia and the Pacific. This program is drawing on a co-design workshop conducted in November 2019 with young engineers of the Central Water Commission to capture their ambitions for the YWP Program.

AWP is proud to support the next generation of water leaders in India. On behalf of our partners and colleagues, I wish all participants success in the program and in their exciting future water careers.



A handwritten signature in black ink that reads "Michael Wilson".

Michael Wilson  
Chief Executive Officer  
Australian Water Partnership



I am happy to know that National Hydrology Project (NHP), in collaboration with Australian Water Partnership (AWP), is launching the India Young Water Professional Programme (YWP). The programme is led by Western Sydney University and Indian Institute of Technology, Guwahati in association with the Australia India Water Centre (AIWC).

This initiative has been taken under the ambit of Memorandum of Understanding between India and Australia on cooperation in the field of water resources management to capacitate 40 young water professionals in two phases. This would be a significant milestone towards institutional capacity building in NHP targeting young professionals.

I hope this programme will be able to meet the objective to equip selected young professionals with necessary skills, knowledge, behaviours and networks that will better enable them to contribute to the development and management of water resources, and to address the competency and leadership needs as per priorities of the water sector in India. Youth can play a significant role for managing the water resources by acting as stakeholders and taking up responsibilities for sustainable management of water.

The collaboration between the two countries will also encourage exchange of issues and solutions in the water sector.

I compliment teams of NHP and AWP for initiating this YWP training program in association with the Australia India Water Centre (AIWC) and wish the program all the success.



  
(Pankaj Kumar)

Pankaji Kumar  
Secretary

Government of India, Ministry of Jal Shakti, Department of Water Resources, River Development and Ganga Rejuvenation



# WESTERN SYDNEY UNIVERSITY



## Working together for sustainable water futures

I am pleased to provide this Foreword for the Water Matters for India - Young Water Professionals Program (YWP) Resource Book. The YWP, funded by the Australian Water Partnership and led by the Australia India Water Centre and Western Sydney University, is a transformational capacity development program for Indian Young Water Professionals.

The Australian India Water Centre (AIWC) is a consortium of Australian and Indian universities, research institutions and water businesses partnered to promote co-operation and collaboration in water. The AIWC includes internationally recognised leaders in research, education, training and capacity building activities related to water.

The AIWC is committed to working together for a common goal aligned to the UN Sustainable Development Goals (SDG) 2030 framework to explicitly contribute to SDG 2 Zero Hunger; SDG 5 Gender Equality, SDG 6 Clean Water and Sanitation, SDG 10 Reduced Inequities and SDG 13 Climate Action.

Designed to build a long-lasting relationship between India and Australia, the YWP program will be of mutual benefit for both countries. I am delighted to see this program develop and excited for future possibilities for collaboration between Australia and India.



Professor Barney Glover AO  
Vice-Chancellor and President  
Western Sydney University





### *Water Matters a Lot, It Matters a Lot More for India*

While water matters for all, for India, with around 80% of the population belonging to the farming community and with large spatiotemporal variation in water availability, it matters a lot more. With impact of climate change, spatiotemporal variation in water availability is further increasing, causing both flood as well as drought, and water utilization still remains far below its potential. Water project planned and designed scientifically with due consideration to socioeconomic aspect can help attain sustainable utilization and management of water.

Water Matters for India - Young Water Professionals Program (YWP) to be implemented through Australia India Water Centre (AIWC) led by Western Sydney University (WSU) and Indian Institute of Technology Guwahati (IIT Guwahati) is, therefore, a right program at the right time and we are happy to be a part of this new beginning. Apart from having theoretical courses to strengthen the scientific knowhow of the trainees, the program is planned in an innovative way to train participants through projects addressing field problems.

In India, most of United Nation's Sustainable Goals directly or indirectly depends on the development of varied water sectors. Therefore, while being in the line of United Nation's SDG-6, this program will also help in the sustainable development of the country as a whole.

This collaborative program will not only help young water professionals to have new outlook towards planning, design and implementation of project utilizing both Indian and Australian experience, it will also open out many avenues for future collaboration between both the countries.



Professor T. G. Sitharam  
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## 2 Key Contacts

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## Open Learning Support

For general queries please visit the Open Learning User Support site via <https://help.openlearning.com/> or alternatively please contact the Australian team (listed above).



The Young Water Professionals Program (YWP) is purposely designed to develop transdisciplinary and systemic thinkers, capable of identifying and improving a problematic situation, and skilled at effectively communicating with a wide range of different people in different roles to effectively lead positive change.

### 3 Introduction: A Transdisciplinary Learning Program

‘Water Matters for India - Young Water Professional Program’ is an innovative professional training program that is led by Western Sydney University and Indian Institute of Technology, Guwahati on behalf in the Australia India Water Centre (AIWC).

The YWP program is a collaboration between the Australian Water Partnership and the National Hydrology Project (NHP), Ministry of Jal Shakti in India. The intent of the program is to develop the leadership competencies and capacities of young Indian Water Professionals currently working in the water industry sector in India. The YWP program design is based on transdisciplinary learning approaches and a flipped curriculum model of delivery.

The YWP program includes online interactive lectures, workshops, coaching and project-based learning. Participants will have

opportunities to research a real-life ‘Situation Understating and Improvement Project’ (SUIP) while internalising transdisciplinary and sustainable water management concepts and approaches, dealing with complexity, communicating with clients, and leading and conducting a case study from start to finish. The training will also prepare Indian Young Water Professionals to understand and contribute towards the United Nations Sustainable Development Goals 2030 and to incorporate gender equity, diversity and social inclusion approaches for managing water in their workplace.

By undertaking the program, participants will learn from and interact with leading researchers and experts in the field from Australia and India as well as each other. Throughout the program, participants will receive expert supervision and mentoring that will assist them in developing leadership skills and competencies at all stages of the program from the selection of project topics and clients to the final reporting of findings in the ‘Sustainable Water Futures Conclave’ (Fig. 1). It is expected that solutions, or recommendations, being proposed by participants, will be adopted, or considered, by the client to have real-life impacts.

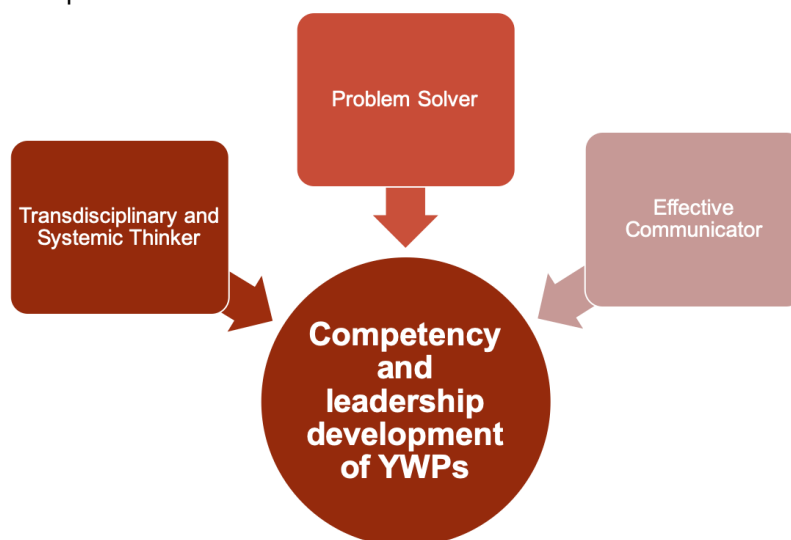


Figure 1: Competencies of YWPs

## 1. A Transdisciplinary Program Design

The Government of India's mission is to deliver clean drinking water to every home, double farmers' income, and improve the health of waterways and liveable cities.

This mission faces enormous social, cultural, ecological, technological, economic, and political challenges in an era of climate induced drought and floods, water scarcity, over exploitation and increasing pollution and deepening social inequities. Professionals working in the water management and resources sector grappling with these challenges usually have disciplinary specific training such as engineering, hydrology, water science, ecology, biology, sociology, and political science. To lead positive change however requires working in and understanding complexity and communicating with a wide range of different people in varying capacities. To successfully lead change a distinct set of capabilities and competencies is required beyond technical and discipline specific knowledge.

Transdisciplinary learning and research approaches have a strong focus on addressing complex human-environmental relationships and as a framework provides opportunities for self-reflexivity, systemic and critical thinking, understanding diverse perspectives and integrates theoretical and practical knowledge through real-world challenges<sup>2</sup>.

One of the major benefits of transdisciplinary learning for learners is that it provides a platform for interdisciplinary innovation and new concepts for transformation and change. It is important to appreciate that transdisciplinary learning is not a replacement of established disciplinary practices but a

complementary approach that supplements disciplinary viewpoints with new knowledge practices.

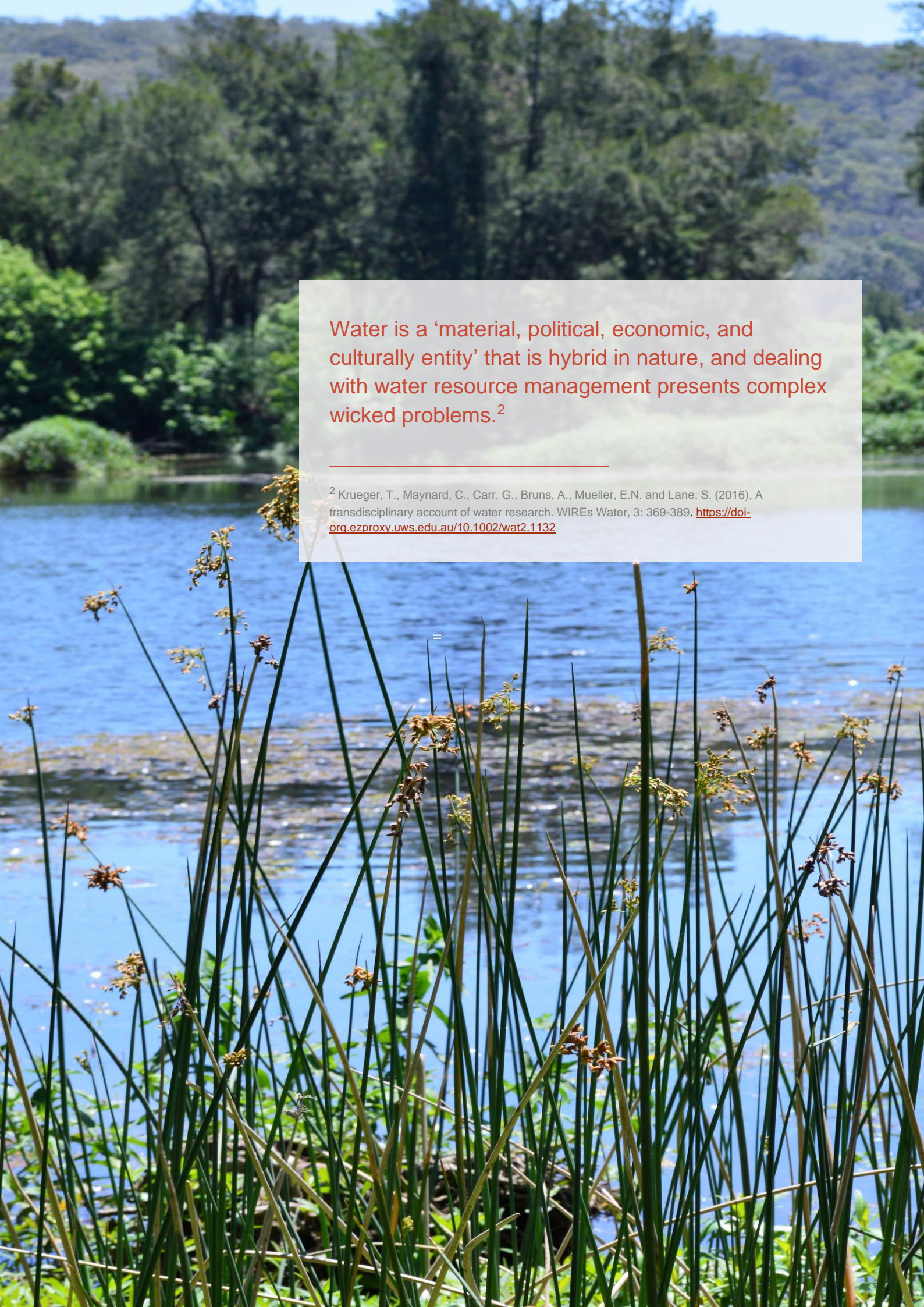
The YWP places socially relevant water issues as the defining feature of its training and will require its participants to connect and collaborate with different professional disciplines in the private and public sectors as well as community representatives from civil society.

The YWP training program is designed to be experiential with an emphasis on 'learning by doing'. For this reason, the training will be 10-20% for online lectures, 20% for coaching and 60-70% project-based learning supported by the AIWC team (Fig. 2). Delivery of the course is through a range of modes with focus on engaged learning.



Figure 2: Elements of the YWP Training Program

<sup>2</sup> Pohl C. What is progress in transdisciplinary research? *Futures* 2011, 43:618–626



Water is a 'material, political, economic, and culturally entity' that is hybrid in nature, and dealing with water resource management presents complex wicked problems.<sup>2</sup>

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<sup>2</sup> Krueger, T., Maynard, C., Carr, G., Bruns, A., Mueller, E.N. and Lane, S. (2016), A transdisciplinary account of water research. *WIREs Water*, 3: 369-389. <https://doi-org.ezproxy.uws.edu.au/10.1002/wat2.1132>

## 2. Gender Equality, Diversity and Social Inclusion (GEDSI) and the UN Sustainable

Understanding and including GEDSI issues in water resource and management is a critical pathway towards inclusive social transformation.

### Development Goals 2030

GEDSI groups are the most vulnerable in terms of access to clean water and sanitation, most at risk during flood and drought due to higher dependence on natural resources and limited adaptive capacity to participate in the social and policy processes to determine more equitable outcomes. However according to the World Bank only 18% of the workforce in water and sanitation are women and they make up less than one in four managerial or

In an international survey of 1.2 million women and children in 114 countries, improved access to clean water and sanitation hygiene was listed as the second highest demand in maternal and reproductive care.<sup>3</sup>

engineering staff, resulting in policies and systems that are not designed for women's needs.

The YWP is underpinned by a deep commitment to GEDSI in two distinct but critical ways. The first is through educational design of the training program itself. The training will highlight and focus on overcoming the barriers related to gender and other discrimination in decision making and demonstrate the significant benefits towards

better, more integrated water resource management that can result from a more equitable and inclusive approach. Tailored lectures and multi-modal learning activities for YWPs to understand and identify key practical steps to engage with women, socially diverse and vulnerable groups in designing and implementing water projects and policies in their workplaces are included. Holistic, evidence-based developmental approaches and interventions that successfully address exclusion/deprivation of vulnerable groups will be included as case studies. A further educational design aspect of incorporating GEDSI is through the SUIP. Each project will need to demonstrably consider GEDSI aspects, from the design of project methodology to data collection and analysis, through to the development of recommendations for improvement. The second way GEDSI commitments is practically demonstrated by the YWP is through representation. Participants, academics, and water industry professionals will be representative of the wider water sector and the greater community. Participants will include equal participation of women and trainees from diverse backgrounds. Incorporating women's perspective will be delivered by female academics and water industry professionals.

Implementation of GEDSI commitments has strong linkages to the United Nations Sustainable Development Goals (SDGs) 2030 agenda. The YWP systemic approach to training will further enhance and deepen understanding of the SDGs which will be situated in real world learning contexts. The SDG framework is set up as an integrated approach to social change and while all SDGs are relevant to this program specific focus will be on SDG 2, 4, 5, 6, 10 and 17 and their associated targets.

<sup>3</sup> White Ribbon Alliance (2021), Global Results: What Women Want: [online] Available at: [https://www.whiteribbonalliance.org/wp-](https://www.whiteribbonalliance.org/wp-content/uploads/2019/06/What-Women-Want_GlobalResults.pdf)

[content/uploads/2019/06/What-Women-Want\\_GlobalResults.pdf](https://www.whiteribbonalliance.org/wp-content/uploads/2019/06/What-Women-Want_GlobalResults.pdf)



2 ZERO HUNGER



4 QUALITY EDUCATION



5 GENDER EQUALITY



6 CLEAN WATER AND SANITATION



10 REDUCED INEQUALITIES



17 PARTNERSHIPS FOR THE GOALS



માસ્વી કાર્યક્રમ અંતર્ગત

જાતિય મુદ્દાઓ અને ભૂગર્ભજળ વ્યવસ્થાપન અંગે સંશોધન હેતુ

કાર્યશાળા

તારીખ : 30/8/2016 થી 31/8/2016, સ્થળ : વલુણા આશ્રમ શાળા



## SDG 2: ZERO HUNGER

**Target 2.3** By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment

**Target 2.4** By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality

## SDG 4: QUALITY EDUCATION

**Target 4.7** By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development

## SDG 5: GENDER EQUALITY

**Target 5.5** Ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic and public life

## SDG 6: CLEAN WATER AND SANITATION

**Target 6.1** By 2030, achieve universal and equitable access to safe and affordable drinking water for all

**Target 6.2** By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations

**Target 6.3** By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of

untreated wastewater and substantially increasing recycling and safe reuse globally

**Target 6.4** By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity

**Target 6.a** By 2030, expand international cooperation and capacity-building support to developing countries in water- and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies

**Target 6.b** Support and strengthen the participation of local communities in improving water and sanitation management

## SDG 10 REDUCED INEQUALITIES

**Target 10.2** By 2030, empower and promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status

## SDG 17 PARTNERSHIPS FOR THE GOALS

**Target 17.6** Enhance North-South, South-South and triangular regional and international cooperation on and access to science, technology and innovation and enhance knowledge sharing on mutually agreed terms, including through improved coordination among existing mechanisms, in particular at the United Nations level, and through a global technology facilitation mechanism

**Target 17.16** Enhance the global partnership for sustainable development, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology and financial resources, to support the achievement of the sustainable development goals in all countries, in particular developing countries

### 3. International Association of Hydrological Sciences

In recognising the integral and interconnected impacts of humans with the hydrology research the International Association of Hydrological Sciences (IAHS) launched the hydrological decade 2013–2022 with the theme “*Panta Rhei: Change in Hydrology and Society.*” This decade recognises the urgency of hydrological research that can understand and predict the interactions of society and water, to support sustainable water resource use under changing climatic and environmental conditions. This has seen an expansion of the discipline of hydrology to encompass the new fields of socio-hydrology and the hydrological cycle and the hydro-social cycle.

Panta Rhei advocates that advances in hydrology are being limited by measurement and monitoring techniques and that the proactive involvement of community can assist in devising innovative new strategies. Future approaches to water science must be based upon an interdisciplinary approach.

“The interaction between hydrology and society is changing, therefore implying new connections and in particular more significant feedbacks which need to be understood, assessed, modelled and predicted by adopting an interdisciplinary approach. Humans are an important part of the system: there is the need to study the two-way coupling between humans and nature (socio-hydrology) within a more comprehensive framework.”<sup>4</sup>

### 4. Training Approach: Participants as Co-designers of

<sup>4</sup> Panta Rhei (2021). *Changes to Hydrology and Society* [online]. Available at: <https://iahs.info/Commissions--W-Groups/Working-Groups/Panta-Rhei.do>

### Professional Development

The AIWC is committed to a distinctive and signature learning and teaching approach called ‘Partnership Pedagogy’. This is an approach to training and professional development that involves AIWC members, external partners and training participants in a process of learning from, and giving to, each other in partnership. This is an unusual approach to curriculum co-creation because it disrupts traditional ways of doing training and education where the experts’ knowledge is passed on didactically to training participants who absorb it for application. Instead, Partnership Pedagogy acknowledges that the participants bring a wealth of professional expertise that enables them to co-design and structure their learning and development, with a whole range of diverse partners.

Partnership Pedagogy involves four elements:

1. co-design,
2. co-development,
3. co-delivery, and
4. co-credential and co-assessment.

It is also underpinned by three values: integrity, transdisciplinarity, and

The YWP program is designed to provide an authentic, meaningful and impactful learning journey.

interdependence. As the training participants are one of the major contributors in Partnership Pedagogy, there will be many opportunities to actively pursue professional curiosities and to structure individual learning and professional development pathways.

Participants are located at the centre of the educational and learning experience. The learning in this training is achieved through interactions – learning facilitators and presenters, peers and information and

knowledge sharing. In this training, the aim is to design learning that combines the best of online and project-based learning that facilitate trainees to learn, develop, thrive and build the skills and competencies they need to lead and excel in their workplace.

‘Socio-hydrology’ refers to “the science of people and water, a new science that is aimed at understanding the dynamics and co-evolution of coupled human–water systems”. The related concept of the “hydro-social cycle” refers to the inseparable social, political and physical dimensions of water.<sup>5</sup>

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<sup>5</sup> Sivapalan, M., Savenije, H.H. and Blöschl, G., 2012. Socio-hydrology: A new science of people and water. *Hydrol. Process*, 26(8), pp.1270-1276.



## 4 Training Program Details

### 5. Training Program Learning Outcomes

Upon successful completion of the program, participants will be able to:

- Understand transdisciplinary aspects of water management in targeted areas based on their learning needs as well as those required in their workplace.
- Critique the complexities of sustainable water management challenge by adopting a systematic approach.
- Design and conduct a real-world project to improve a water resource situation using evidence and resources in an ethical manner.
- Communicate effectively and succinctly to a range of diverse stakeholders.
- Appraise gender equality, diversity and social inclusion in the water sector.
- Report findings, or make recommendations, to improve a water resource situation and
- Critically reflect and improve on own professional practice and leadership skills in promoting optimal outcomes in water sector.

**Table 1: Expectations of participants**

### 6. What is Expected of You

For participants to successfully compete the training program, we expect the followings you to complete all learning tasks and the associated requirements (refer to Table 1).

### 7. Training and Research Integrity

In submitting assessments associated with YWP Program, it is essential that you understand the principles of training and research integrity. You are expected to act honestly and ethically in the production of all training and research work and associated assessment tasks, submit work that is your own and acknowledge any contribution to your work made by others. Important information about academic integrity, including advice to training participants is available at:

<https://library.westernsydney.edu.au/main/guides/turnitin/academic-honesty>

How to successfully complete the training	Requirements
Duration and Hours	The duration of the program is 10 months. It is expected that participants will spend 450 hours in completing learning tasks, both structured and self-directed.
Attendance	It is strongly recommended that students attend all scheduled learning activities to support their learning.
Online Learning Requirements	Training materials will be made available on the OpenLearning site. You are expected to consult OpenLearning at least twice a week, as all training announcements will be made via this platform. All learning materials will be regularly updated and posted online by the program team.
Essential Equipment	Access to a computer and the internet.

## 8. Volume of Learning

For you to successfully compete the training program, you are required to complete the below training and development tasks (refer to Table 2).

It is your responsibility to familiarise yourself with these principles and apply them to all

- copied from any other source except where due acknowledgement is made in the assignment;
- submitted by you in another (previous or current) assessment, except where appropriately referenced;
- written/produced for you by any other person except where collaboration has been authorised by the YWP training program team.

Type of training and development	Estimated training and development efforts on task
<b>A. Online lectures on different aspects of sustainable water futures</b>  Online lectures (20) on different aspects of sustainable water futures and learning activities before and after the lectures	150
<b>B. Situation Understanding and Improvement Project (SUIP)</b> <ul style="list-style-type: none"> <li>• Spend 40-50 hours to study online resources, attend live sessions, complete pre/post learning tasks, review and revision</li> <li>• Spend 40-60 hours to prepare and attend workshops/ seminars</li> <li>• Spend 50-60 hours to prepare and attend coaching sessions.</li> <li>• Spend approx. 100 hours to prepare and complete SUIP project</li> <li>• Spend approx. 50 hours on self- directed learning, including collecting learning evidence for the portfolio</li> </ul>	300
<b>Total</b>	<b>450</b>

work submitted as your own. When you submit an assignment or product, you will declare that no part has been:

**Table 2: Training and development for YWP**



## Learning and Capacity Building Outcomes

The SUIP will assist the chosen client to improve a situation using transdisciplinary research skills and resources in an ethical manner.

1. Evaluate chosen SUIP methodology, first in a small-scale pilot and revise it in light of this for undertaking the SUIP.
2. To be able to design, implement and manage a project to bring about an improvement in a client's situation. Being able to build relationships and rapport with professionals in their workplace and region.
3. Ability to communicate with a client and maintain a professional relationship.
4. Ability to effectively respond to feedback from either the project facilitator, peers and the client.
5. Ability to use project management techniques such as action plans, timelines, Gantt charts, etc.
6. Development of professionalism in the reporting mechanisms initiated, formal and informal with the project facilitator and the client.
7. Ability to deal with uncertain/unforeseen factors and emergent factors and to negotiate changes in the project.
8. Apply effective time management and reflect on the SUIP research process by maintaining a study journal and field notebook.
9. Understanding and application of research principles, data collection & analysis techniques in the workplace/community.
10. An appreciation of their and client's worldviews, beliefs, and values and how these influence the interpretations made in their project work.
11. Critically reflect on progress with and development of skills for independent study.

## 5 Situation Understanding and Improvement Project (SUIP)

### 9. What is SUIP?

The Situation Understanding and Improvement Project (SUIP) is the 'engine room' of this training program, and YWPs will devote a significant part of their effort and time (up to 70%) to develop their competencies and leadership qualities. The overall aim the SUIP is to facilitate the training participants' development of competency as professionals in sustainable water futures. Participants will work with client in complex situations related to managing and sustaining water in urban, peri-urban and rural landscapes.

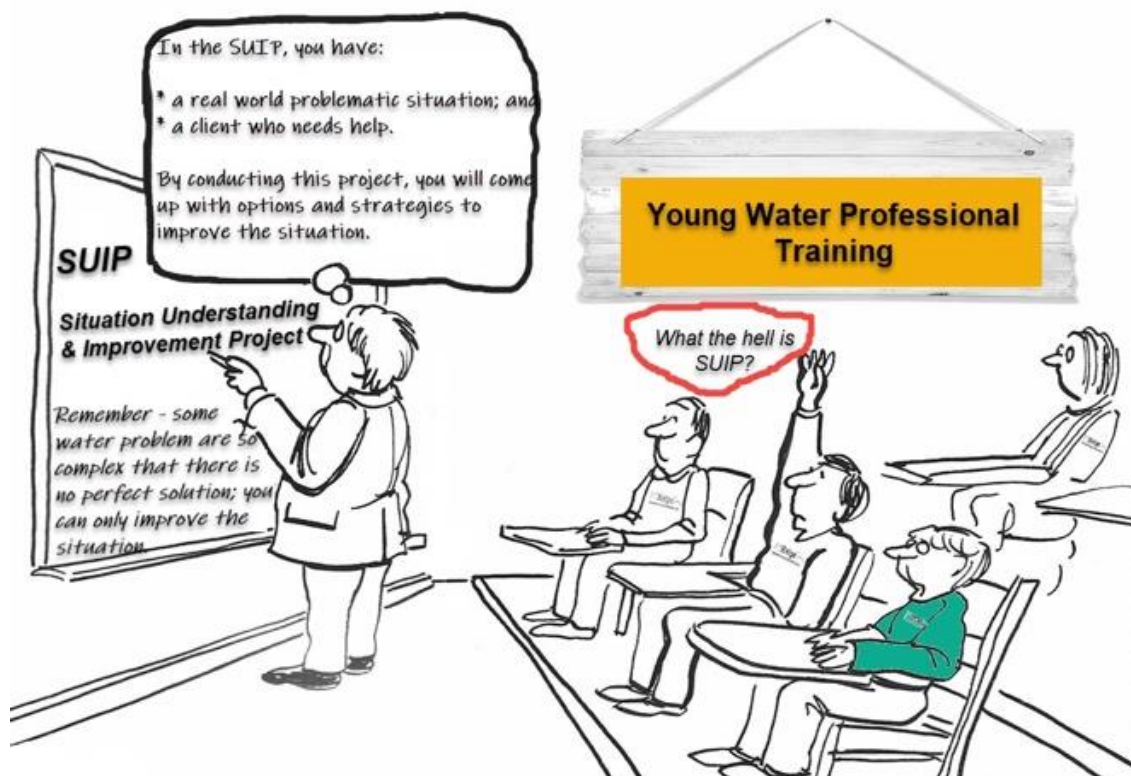
Through SUIP, YWPs will research a situation to understand and improve it. It is important to remember here that water issues and challenges these days are complex and transdisciplinary in nature and they are often 'wicked' problems. Often, there is no perfect

one solution, but one can only improve a given situation with the objective to 'make things better'.

The focus of SUIP will be on developing participants as transdisciplinary and systemic thinkers and practitioners in the undertaking of the project and working with a specified client(s). The SUIP will entail interdependent relationships with their client and resource people (AIWC and NHP) and involve the full range of project management. Specifically, because of this engagement and related activities, YWPs will be able to develop and argue a case for competency development. The project here is simply a 'vehicle' to facilitate participant learning and development in a 'real-world' situation.

### 10. What will be involved in the SUIP?

YWP participants will work on a 10-month long group project (2 persons/group) and select a SUIP topic (e.g. how can effective community engagement be achieved in groundwater





management?) that is relevant to the Ministry of Jal Shakti (MoJS), the National Hydrology Project (NHP) or YWP participant's own workplace to understand and develop solutions to a complex water management situation. Participants will therefore need to have a client for their project - most likely MoJS, NHP or relevant Department who has the interest/stake in the SUIP and can implement the project findings. YWP participant competency and leadership development through SUIP will be supported through a series of on-line lectures and workshops on relevant topics, coaching, mentoring and some hands-on activities.

The SUIP will require a transdisciplinary approach and needs a selection of a carefully articulated real-world projects with viable and feasible aims achievable within the timeframe of 8-9 months. The conceptualization of transdisciplinary research approach in the SUIP needs to:

- focus on a socially relevant water issue, not a technical issue alone (e.g., safe and clean water to every home)
- integrate a range of perspectives and ideas to understand the problematic situation and develop options to improve the situation; and
- include an element of critical participatory research, i.e., connecting knowledge, experiences and insights from a range of disciplines connected with water sustainability and management.

## 11. SUIP Content and Planning

SUIP content will include the following:

- Project development and management;
- Methodology development & application;

- Qualitative and quantitative research methods;
- Development of transdisciplinary and systemic thinking and understanding;
- Learning and group process;
- Methods of intervention relating to facilitating improvements in a situation;
- Ethical issues relating to approaches taken in intervening;
- Risk analysis in the conduct of the project; and
- Situation improvement ideas and

The SUIP is designed to allow training participants to demonstrate the application of learning acquired through the training in a 'real world' context.

application.

Training participants will undertake 10-month duration, real-world project. The project will be undertaken in a group of two participants. The project must have:

- A client can be someone from MoJS, State Water Resources Department, a water business or NGO with water challenge/issue to be resolved.
- A well-defined methodology that is consistent with situation understanding and improvement approach;
- Collaborative actions and a transdisciplinary and systemic approach to the project;
- Outcomes that provide desirable and feasible improvement for the client;
- Both primary and secondary data are collected by the participants during the project work;
- Clear evidence of the participants designing and conducting the project - the participant is not seen as a research assistant for the client.

- It is expected that significant reading of relevant literature (past reports, research articles etc.) will be undertaken to inform the conduct of the project.

## 12. Getting started with the SUIP

This involves participants finding a 'client' in an industry, government or community organisation who has a real world problematic situation. The participants then explore with the client how their SUIP can lead to tackling this problem. The first half the SUIP will focus on the design and pilot testing of the SUIP:

- 'Scoping' the SUIP so that it is manageable;
- Completing an appropriate 'Risk Assessment' for the work involved;
- Developing appropriate study tools for time-management, learning portfolio and referencing, and report writing;
- Analysing client's problematic situation in the context of existing knowledge with a comprehensive review of available reports and published articles;
- Designing appropriate methods for collection and analysis of data;
- Obtaining any ethics clearance required;
- Undertaking a small-scale pilot study to test the data collection method and analysis and revising the methods in light of a critical review of the pilot.
- Presenting the results in the form of a comprehensive report to the client showing how the study was undertaken and the conclusions and recommendations (and limitations in these) that can be drawn from it.
- Undertaking a critical review of the project that identifies:

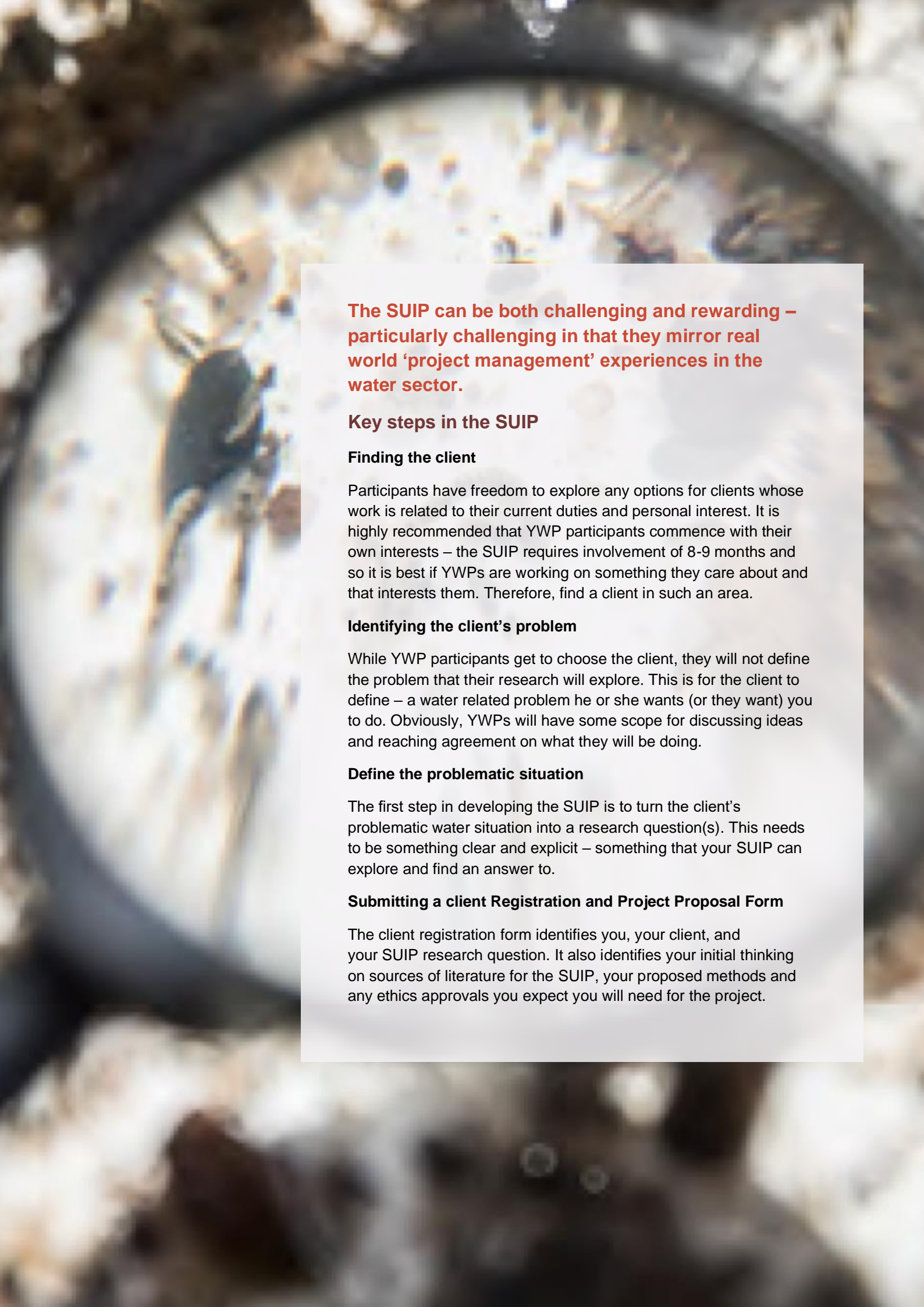
*What would be done differently if it were done again?*

*What the participants has learned from undertaking it - professionally and personally?*

*How this experience can contribute to his/her improving their ability in the workplace and future career?*

As such, it requires attention to advance planning for meeting milestones, and flexibility and initiative in dealing with inevitable crises when things don't go to plan. Participants will be supported through the process of designing and implementing their projects by fortnightly facilitation workshops/meeting that identify relevant tasks, provide information on how these can be tackled and opportunities to then tackle these with practical exercises.

The YWP participants will also be supported by small group supervision meetings facilitated by a group. Project supervisors will provide feedback on work submitted for review and assessment, which participants then revise as part of the next assessment task. Participants will also complete their own self-assessment of each task and obtain assessment from their peers using the assessment criteria sheet for the task. These provide the basis for the discussion and feedback, assisting student to gain clearer understanding of training and capacity building expectations and developing skills in self-evaluation and self-directed learning and development.



**The SUIP can be both challenging and rewarding – particularly challenging in that they mirror real world ‘project management’ experiences in the water sector.**

### **Key steps in the SUIP**

#### **Finding the client**

Participants have freedom to explore any options for clients whose work is related to their current duties and personal interest. It is highly recommended that YWP participants commence with their own interests – the SUIP requires involvement of 8-9 months and so it is best if YWPs are working on something they care about and that interests them. Therefore, find a client in such an area.

#### **Identifying the client’s problem**

While YWP participants get to choose the client, they will not define the problem that their research will explore. This is for the client to define – a water related problem he or she wants (or they want) you to do. Obviously, YWPs will have some scope for discussing ideas and reaching agreement on what they will be doing.

#### **Define the problematic situation**

The first step in developing the SUIP is to turn the client's problematic water situation into a research question(s). This needs to be something clear and explicit – something that your SUIP can explore and find an answer to.

#### **Submitting a client Registration and Project Proposal Form**

The client registration form identifies you, your client, and your SUIP research question. It also identifies your initial thinking on sources of literature for the SUIP, your proposed methods and any ethics approvals you expect you will need for the project.

## 6 Assessment Details

The assessment items in this training are designed to enable you to demonstrate that you have achieved the Program Learning Outcomes.

**Table 3: Assessments related to online lectures and professional development.**

Title	Style	Weighting
Online Quiz 1	Individual	25%
Online Quiz 2	Individual	25%
Online Quiz 3	Individual	25%
Reflection on Technical Capacity Development	Individual	25%

**Table 4: Assessments related to SUIP.**

Title	Length	Style	Weighting
Draft Proposal	1000 words	Group	10%
Oral Presentation	10 minutes	Group	20%
SUIP Project	4000 words	Group	30%
Learning Portfolio for Professional Leadership Competency Development	3000 words (or equivalent)	Individual	40%

## 7 YWP Water Conclave

The YWP Sustainable Water Futures Conclave will be the culmination of the training program where YWPs will reflect on their learning experience and development through the training program.

They will also present their SUIP to peers, giving and receiving feedback and building on this experience to improve the Final SUIP report and the overall learning outcomes.

## 8 Lectures, Coaching Circles and Workshops

### 13. Lectures with specialist topics in water

Experts in the field will produce a short video overview and recommend readings on selected topics. The resources will be made available for participants via OpenLearning portal. Participants are required to complete learning tasks prior to the live section for optimal learning experience. During the 2 hrs live session, experts will deliver a 20-30 min presentation followed by interactive activities with YWP participants.

### 14. Coaching Circles

Coaching Circles will be run during this training program to facilitate learning and development of the participants to design and lead future water projects in their workplaces. They provide a trusting environment for YWP participants to facilitate and coach each other in exploring the challenges and complexities of their roles and in designing effective and authentic ways to achieve what matters most to them in their professional development. There will be several Coaching Circles during this training program at a monthly interval to assist with their project work and competency development. More details about the concept of Coaching Circle are at: <https://vimeo.com/219732495>

### 15. SUIP

The overall aim the SUIP is to facilitate the training YWP participants and their leadership competency development as professionals to foster sustainable water futures. YWP participants will work with a designated client in complex situations related to managing and sustaining water in urban, peri-urban and rural

landscapes. The purpose of the project is to research a situation to understand and improve it. It is important to remember here that water issues and challenges these days complex and transdisciplinary in nature and they are often 'wicked' problems. Often there is no perfect one solution, but an effort to improve the given situation. The focus of SUIP will be on developing trainees as transdisciplinary and systemic thinkers and practitioners in the undertaking of their project and working with their client(s). The project will entail interdependent relationships with their client and resource people (AIWC and NHP) and involve the full range of project management. Specifically, because of this engagement and related activities they will be develop and argue a case for competency development. The project here is simply a 'vehicle' to facilitate their learning and development in a 'real-world' situation.

### 16. Professional Leadership Competency Development

The YWP Program has a suite of curated leadership and professional development modules and individual self-assessments that you will undertake over the course of the program. These will connect with the SUIP as well as your current workplace practices and – together with your mentoring and academic supervision - allow you to reflect on your current capabilities and competencies and identify directions for your own individual professional growth. This part of the training program directly links with the training learning outcome to 'critically reflect and improve on own professional practice and leadership skills in promoting optimal outcomes in water sector.' These self-directed online learning modules are short (less than 45 minutes) and cover:

- Leadership and management skills

- Gender equity and diversity in the workplace
- Workplace ethics leadership and values
- Cultural intelligence
- Unconscious bias
- Communication and presentations

Completion of these modules scaffold into the final assessment which is the development of a YWP learning portfolio and the completion of the module quizzes, self-assessments and reflections collated as evidence of this professional learning.

## 9 Learning and Teaching Activities

### 17. YWP Program Timetable

The draft program outlines the YWP monthly activities and assessments (refer to Table 3). Please note that the topics and activities may be subject to change.






Date	Topic	Program Activities	Coaching Activities	Assessments	
December 2021 - January 2022	Overview and introductions; Systemic approaches to water sustainability	Program launch	Coaching circle 1		Learning Portfolio
February 2022	Water Governance and Policy; Project Management essentials	Workshop 1	Coaching circle 2 and 3		Learning Portfolio
March 2022	Water for Agriculture; Professional practices for successful leaders	SUIP Proposal Seminar	Coaching circle 4 & 5	Proposal	Learning Portfolio
April 2022	Groundwater Sustainability; Data collection and analysis	Workshop 2	Coaching circle 6 & 7		Learning Portfolio
May 2022	Water in Urban Landscapes; Presenting with impact; Cost benefit analysis		Coaching circle 8		Learning Portfolio
June 2022	Water in Urban Landscapes (continued); Communication strategies	SUIP progress seminar	Coaching circle 9 & 10	Presentation	Learning Portfolio
July 2022	Water use efficiency; Understanding different values in stakeholder consultations	Workshop 3	Coaching circle 11 & 12		Learning Portfolio
August 2022	Water use efficiency; Understanding different values in stakeholder consultations	Workshop 3	Coaching circle 11 & 12		Learning Portfolio

**Table 3: Draft Timetable for YWP**






September 2022	Water, energy and food nexus; and 'Doubling the Farm Income; Water and Society (WASH); Community Participation; Gender and Socio-cultural aspects; Water for every home mission	Workshop 4	Coaching circle 13 & 14		Learning Portfolio
October 2022	River health; Water informatics; GIS and remote sensing		Coaching circle 15 & 16		Learning Portfolio
November 2022	Climate change; Managing Droughts and Floods; Negotiation and Conflict Management  Technologies that could Transform Water Management (including WQM, WQT applications)	Workshop 5	Coaching circle 17 & 18  Coaching circle 19 & 20		Learning Portfolio
December 2022	Water for Sustainable Futures	YWP Water Conclave		Final Report	







\* dates, topics and activities subject to change



## 18. Water Matters for India: Young Water Professionals 2021

<p>Mrs. Abha Garg Master in Hydraulic Engineering</p>	<p>Research Assistant Central Water and Power Research Station (CWPRS) currently working on disaster management and emergency action planning. Experienced in hydraulic and hydrologic mathematical modelling, flood estimation, safe grade elevation determination and dam breach studies.</p>	
<p>Dr. Alok Kumar Meher Phd Environmental analytical chemistry and wastewater treatment.</p>	<p>Junior Scientific Assistant at Central Pollution Control Board (CPCB), Delhi current responsibilities include the novel analytical method development and validation for the inorganic aqueous environmental contaminants by using spectroscopic techniques, specially focused towards the elemental parameters.</p>	
<p>Mrs. Annie Maria Issac Master of Engineering in Environmental and Water Resources Engineering</p>	<p>Scientist/Engineer with Water Resources Group (WRG) of National Remote Sensing Center (NRSC), ISRO, Hyderabad. As part of National Hydrology Project (NHP), she is working towards development of Web Enabled Hydrologic Modelling System in SWAT and actively involved in various user projects using remote sensing techniques for irrigation management.</p>	
<p>I</p>		
<p>Mr. Arun Lal MSc Geology</p>	<p>Working as a Junior hydrogeologist Groundwater Department in Kerala for the past 3 years. He obtained his MSc in Earth science from Pondicherry University and has experience in river modelling and sand auditing.</p>	
<p>Mr. Harpalsinh J. Raol Master of Technology in Transportation Engineering</p>	<p>Assistant Engineer in Water Resources Department, Gujarat. Currently working Dharoi Dam on flood monitoring, controlling and management activity, dam safety works, water conservation activities. Worked on developing a draft framework for rapid risk screening of dams under World Bank Assisted Dam Rehabilitation and Improvement Project (DRIP) phase-II &amp; III.</p>	









<p>Dr. K.Bhagya Ph.D</p>	<p>Assistant Geophysicist in Ground Water Department, Government of Telangana State, undertaking geophysical and geological surveys under land purchase schemes and water monitoring of water levels of piezometers. Involved in the “Preparation of GIS based Water Conservation Plans and Inventory of Water Bodies of Districts, Telangana, under the Jal Shakti Abhiyam: “Catch the rain campaign”.</p>	
<p>Ms. Harshitha Master in Water Resource and Environmental Engineering</p>	<p>Deputy Director, Central Water Commission (CWC), MoDR, RD &amp; GR, Govt. of India. Currently vetting, designing, and planning of hydro-electric projects from aspects of hydel civil designs. Works related to formulation of BIS codes, guidelines and special technical issues on water resource projects are routinely handled as part of responsibilities.</p>	
<p>Mr. Mandeep Singh Master Technology in Structural Engineering</p>	<p>Executive Engineer (Canal Design) in Water Resources Department (WRD) Government of Punjab. Design Engineer in in canal systems underground piped water distribution networks, system of dams of Kandi area of Punjab and other hydraulic structures over canal like bridges, falls, head regulator.</p>	
<p>Dr. Vidhya GS PhD in Hydrogeology</p>	<p>Junior Hydrogeologist in State Ground water department Kerala. She has joined Kerala Government service in the year 2016 as Geological Assistant in State Ground water department and continuing the service.</p>	
<p>Monisha S. Master of Engineering</p>	<p>Assistant Engineer, Tamil Nadu</p>	
<p>Miss. Rashmi K Master of Technology in Water Resources Development (WRD)</p>	<p>Assistant Engineer at Karnataka Engineering Research Station (KERS). Involved in River Basin Modelling with Source Platform and preparing State Specific Action Plan on Climate Change for Karnataka (SSAPCC). Organized national-level training programs under Karnataka integrated water resources management and investment program.</p>	
<p>Mr. Sanjay Meena Master Technology</p>	<p>Deputy Director Remote Sensing Dte, Environment management Organization (EMO), Central Water Commission (CWC). Primarily deals with the sedimentation assessment and estimation of the loss of the live storage capacity of the reservoirs using the Remote Sensing techniques.</p>	



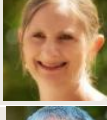
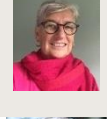

<p>Miss. Vartika Master of Technology in Highway Engineering</p>	<p>Junior Engineer in River Data Compilation-1 Directorate, Central Water Commission, New Delhi. She has joined the government service in the year 2016. She has good exposure on Monitoring of Glacial Lakes &amp; Water Bodies in the Himalayan Region of Indian River Basins. Moreover she is also involved in works related to Morphological study of rivers.</p>	
<p>Dr. S Signum Master Technology in Structural Engineering</p>	<p>Asst. Deputy Director (Civil) in Department of Water Resources, Odisha, Bhubaneswar. Working under National Hydrology Project currently dealing Hydrological Modelling, Dam Break Analysis, River Basin Modelling, Remote Sensing and GIS and Purpose Driven Studies.</p>	
<p>Irom Royal M. Tech (Water Resources)</p>	<p>Working Superintending Engineer in Manipur and obtained M.Tech from Indian Institute of Technology, Guwahati.</p>	
<p>Mr. Sunil Kumar S Master of Technology in Water Resources Development</p>	<p>Assistant Engineer in Advanced Centre for Integrated Water Resources Management (ACIWRM), Water Resources Department, Karnataka. Working in remodelling of Visveswaraya Canal network of Krishnarajasagara reservoir, Irrigation Water Management in tailend reaches of Visveswaraya Canal network and River Rejuvenation work of Arkavathi river in Karnataka state.</p>	
<p>Mrs. Preeti Pandey M. Sc. (Tech.) Geology</p>	<p>Scientist-B in Central Ground Water Board in Western Region Jaipur. Prior to joining Government service in 2015, she was working as CSIR-JRF Fellow on 'Petrochemical Analyses of Coals in Mand Raigarh Coalfield.</p>	
<p>Mr. Uddeshya Kumar Master Science and Technology (Applied Geology)</p>	<p>Scientist-B (Hydrogeology) in Central Ground Water Board, Raipur, Chhattisgarh. Currently, he is looking after NAQUIM and Ground Water Exploration projects of Chhattisgarh state and been involved in organizing Training, Mass Awareness Program, Public Interaction Program focused on creating awareness among stakeholders.</p>	





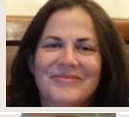









Mr. Vanlalpekhlua Sailo Master of Technology in Hydrology	Sub-Divisional Officer in Champhai Sub-Division and attached in Office of the Chief Engineer as Assistant Engineer, Irrigation & Water Resources Department, Government of Mizoram. Currently working on the preparation of Detailed Project Report of Minor Irrigation Schemes, Flood Management Programme and also construction and maintenance of irrigation facilities.	
G. Srinivasulu M. Tech	Deputy Director, National Water Academy. He holds degree in Bachelor of Engineering (Civil Engineering) from S.V. University, Tirupathi and M. Tech in Structural Engineering from Indian Institute of Technology Bombay.	

## 19. Resource Persons

The training resource team will provide SUIP supervision and mentoring throughout the training program. The resource team will help YWPs to develop skills and competencies at all stages of the YWP training program, from selection of project topic and client, to the final presentation of findings towards the end of their training period.

Name	Expertise	
Arora, A/Prof. Meenakshi	Urban Water Cycle modelling, Water quality, Contaminant transport modelling and groundwater remediation.	
Ashok, Prof. Alaknanda	Application of Internet of thing (IoT) and Wireless Sensor Network for smart GIS based Water Info System.	
Barua, Prof. Anamika	Climate change and water security, ecological footprints, virtual water and water governance including transboundary water governance.	
Basavarajappa, Prof. Manoj Kumar	Advanced water and wastewater treatment; monitoring and modelling of surface water quality, urban water system designs.	
Batelaan, Prof. Okke	Short course design and delivery; Groundwater hydrology, groundwater modelling, GIS and remote sensing for hydrological applications and integrated water management.	
Bhattarai, Dr. Basundhara	Gender equality, disability and social inclusion.	

Camkin, Prof. Jeff	Water policy, water governance, water resource allocation, stakeholder engagement, and water education.	
Chanan, Dr Amit	Water sector and infrastructure services; stormwater management, water sensitive urban design and project management.	
Dillon, Dr. Peter	Water quality barriers to water recycling for stormwater and treated sewage effluent, aquifer processes, policy and governance issues.	
Dollin, Ms Jen	Sustainability education specialist; community engagement; transdisciplinary and innovative research and teaching; multispecies ethnography and feminist theory.	
Ellyard, Ms. Hannah	Integrated urban water management, legislative review and policy development, strategic and business planning.	
Fallowfield, Prof. Howard	Design, operation, and evaluation of the performance of nature-based wastewater treatment systems.	
Germein, Ms. Susan	Environmental and social justice with a particular focus on the participation of women and protection of water resources; project and research skills; skill in working in an intercultural space.	
Goonetilleke, Prof. Ashantha	Water education and training; Water quality, stormwater/wastewater recycling and water conservation, water, sanitation, and hygiene (WASH),	
Hagare, Dr. Dharma	Wastewater Treatment & Reuse; Water Sensitive Urban Design.	
Jain, Prof. Sharad Kumar	Surface Water Hydrology, Water Resources Planning and Management, Impact of Climate Change, Remote Sensing & GIS, ANNs and Water Governance.	
Khare, Prof. Deepak	Water Resources Planning & Management, Ground Water, Climate Change, Rainwater harvesting, Urban Water and Watershed Management.	
Kumar, Prof. Anil	Soil and water conservation; hydrology; watershed management; rejuvenation of natural water springs; and drought assessment and mitigation.	
Kumar, Prof. Manoj	Water and wastewater treatment; monitoring and modelling of surface water quality, urban water system designs; river health; water education.	

Lan, Prof. Yi-Chen	Water accounting system, life cycle assessment, sustainable and smart horticulture, big data strategies, knowledge management, e-marketing.	
Maheshwari, Prof. Basant	Experiential learning, Groundwater management, Curriculum Design, Irrigation, Stakeholder Engagement and Urban Water Management; Project Management	
Mailapalli, Dr. Damodhara	Teaching, capacity building in on-farm water management; surface and groundwater quality assessment and IoT in agriculture.	
Morton, Mr. Steven	Water policy; Stakeholder engagement and partnerships International water engagement, trade and investment.	
Neto, Prof. Susana	Water and Territorial Planning; Water Governance; Water Policy; Regional Planning; Sustainable Urban Development.	
Packham, A/Prof Roger	Systems theory to educational, rural development and organisational situations, and has been teaching and researching systems thinking and practice.	
Patel, Prof. Jayantilal N.	Internet of Things (IoT) in irrigation water management; water education, engagement and capacity building.	
Prasad, Prof. H.J. Shiva	Hydrology, River Engineering, Ground Water Hydrology, Water Resources Engineering, Water Resources Systems.	
Ramesh, A/Prof. H.	Water resources planning; groundwater monitoring and management; urban water; river health; irrigation; water education, engagement and capacity building.	
Reading, Dr. Lucy	Groundwater monitoring, groundwater resource assessments, groundwater-surface water interactions, and groundwater quality assessments.	
Ryu, A/Prof. Dongryeol	Proximal and remote sensing of water and vegetation and application of the sensing to modelling land-atmosphere interactions.	
Saha, Dr. Uday Shankar	Irrigated and rainfed/ dryland agriculture for sustainable development, implementation & impact studies of participatory watershed management.	
Sarkar, Dr Archana	Hydrological assessment, Climate change on future water availability, sediment yield, agriculture production and natural disasters,	
Sathasivan, Prof., Arumugam	Social, technical, economic and environmental aspects of drinking water supply, wastewater management, climate adaptation, and urban/rural water.	

Shanafield, Dr. Margaret	Groundwater recharge and streamflow generation through intermittently flowing rivers.	
Sharma, Prof. Ashish	Climate change, remote sensing, hydrological modelling, and flood estimation.	
Siddiqui, Prof. Kadambot	Crop physiology, production agronomy, farming systems, genetic resources, breeding research in cereal, grain and pasture legumes and oilseed crops.	
Sitharam, Prof. T.G.	Sustainability of water resources management, underground drains and coastal reservoirs	
Spencer, A/Prof. Ricky Spencer	Freshwater ecology, biodiversity and conservation, curriculum design; sustainability education.	
Stewart, Ms. Simone	Protection of environmental resources and dependent ecosystems, policy development and hydrogeologist.	
Thimmegowda, A/Prof. M.N.	Water sensitive planning for rainfed and irrigated ecosystem; water conservation and management; ground water augmentation; capacity building.	
Tuppad, A/Prof. Pushpa	Hydrology, watershed management, applications of remote sensing and GIS in natural resources management.	
Varua, A/Prof. Maria Estela	Water management; water for livelihood and wellbeing; gender equity; environmental sustainability; circular economy; and capacity building.	
Ward, Dr. John	Political economy of river basin management, monitoring and evaluation, ecosystem services, household subjective wellbeing and rural livelihoods	
Yang, A/Prof. Shuqing	Coastal reservoir development, sustainable water supply for urban, agriculture and environment, and floodwater management.	



# Australia

water partners for development

*The Australian Water Partnership is an Australian Government international cooperation initiative helping developing countries in the Indo-Pacific region, and beyond, work towards the sustainable management of their water resources.*

