



European  
Commission

Horizon 2020  
European Union funding  
for Research & Innovation



# STRATEGIC PLANNING FOR WATER RESOURCES, DEVELOPMENT AND IMPLEMENTATION OF NOVEL BIOTECHNICAL TREATMENT SOLUTIONS AND GOOD PRACTICES

## Capacity Building in Wastewater Treatment and Management

**Rajnish Kaur Calay & Tamas Kovacs**

**7 June 2023**

**Rajnish.k.calay@uit.no**

### Partners

#### *Europe*

**UiT, The Arctic University of Norway**

University of Pecs, Hungary

SINTEF Narvik, Norway

**Finnish Water Forum, Finland**

INESC TEC, Portugal

Enviroinvest, Hungary

#### *India*

**IIT Guwahati**

IIT Kharagpur

IIT BHU, Varanasi

Sagi Rama Krishnam Raju Eng. School

**Elixir Ecobiotek**

Dr. D Y Patil School of Engineering

**Bhimavaram Municipal Council**

Palavi Trust

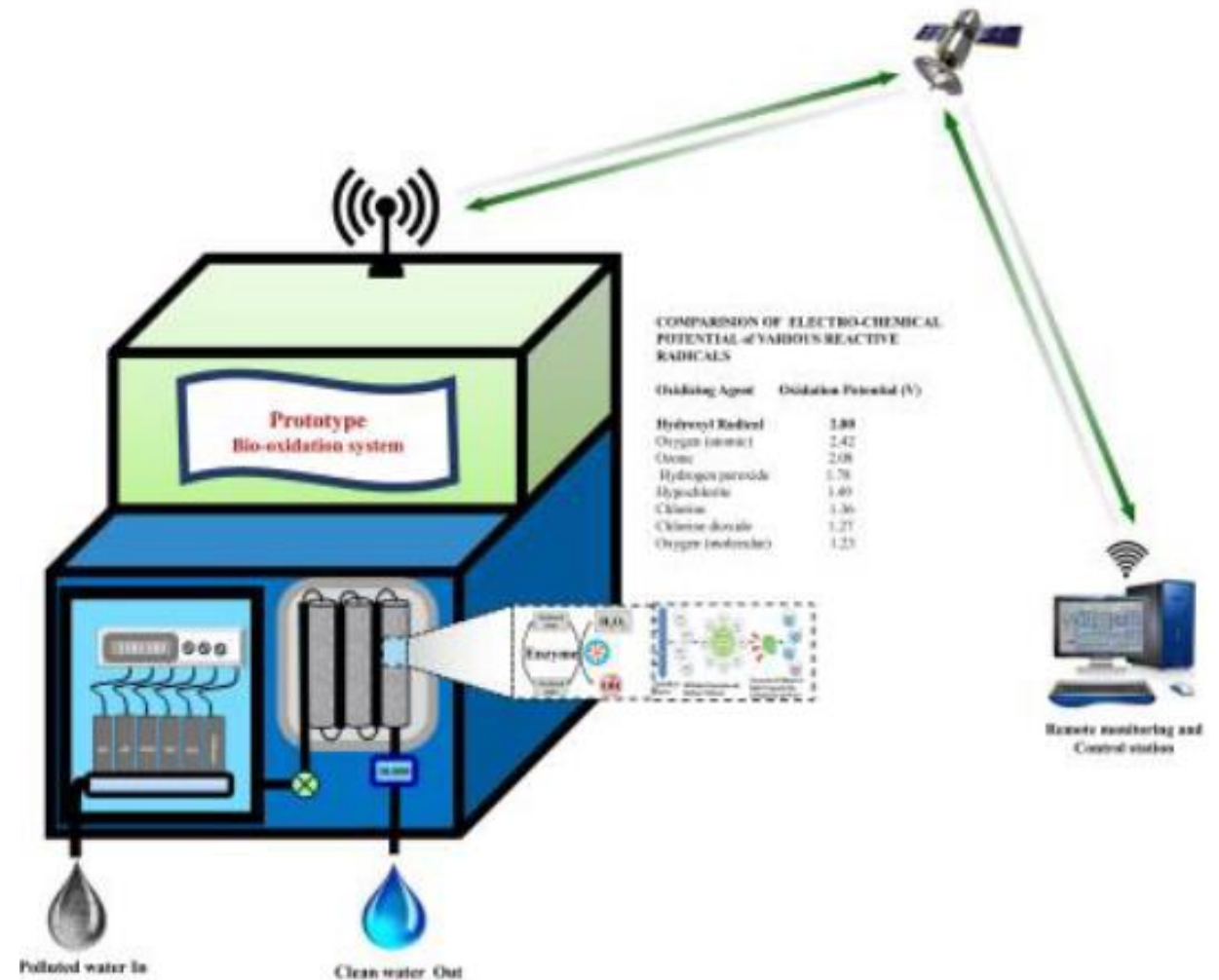
# SPRING solution

## Motivation

To find affordable water purification systems to meet the demand for water in India.

## Objectives

- Develop & demonstrate scalable, innovative, simple-to-operate bio-oxidation systems for the treatment of polluted water bodies and cost-effective real-time monitoring tools.
- Implementation in urban & rural settings, for cleaning both stagnant and flowing water bodies, to cost effectively clean up water bodies and highlight pollutants risks and flooding and/or water insufficiency scenarios.





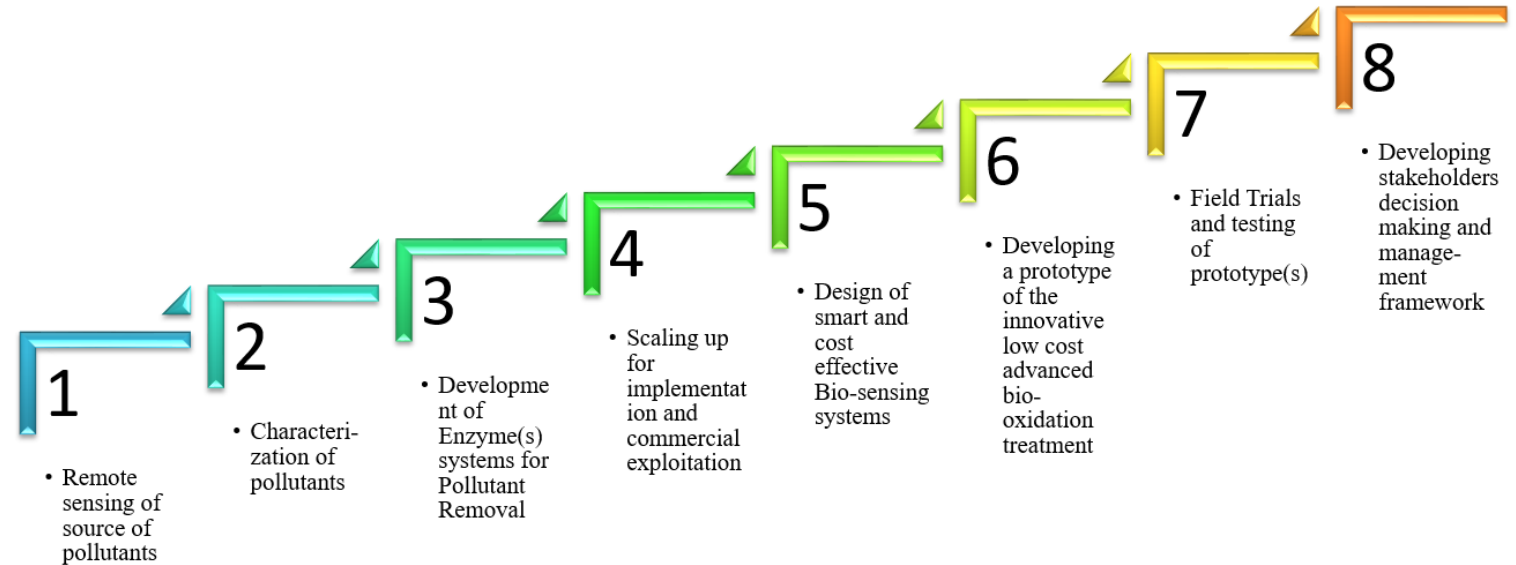
# SPRING Journey

## R & D (1-6)

- Identifying and characterising pollutants and pollutant sources
- Develop bio-remediation technologies for the removal of organic micro-pollutants present in groundwater and surface water.
- Real-time detection systems to highlight different pollutants risks and flooding/water insufficiency scenarios
- Novel microbial technology for water quality monitoring methods.

## Implementation (7-8)

- Field trials of prototype technology carried out in urban and rural areas.
- An inclusive decision-making process involving all stakeholders to support widespread deployment of developed technology.
- Training and awareness campaign for implementing good practices in water management.



# Capacity building activities



Innovation



Skills



Organizational



Societal



# Innovation

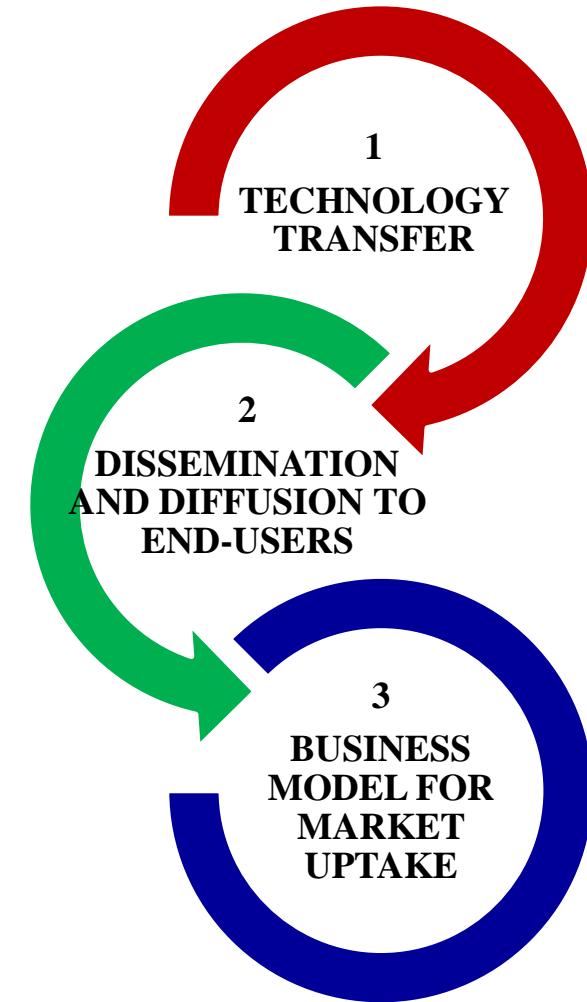


This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No. 821423 and from The Department of Biotechnology, Government of India.



# Workshops and demonstration

1. Demonstration of system involving R&D at TRL3-TRL6. The technology transfer to SMEs, other small water suppliers to undertake further development & maintenance in association with the respective Municipalities.
2. Dissemination to a broader audience of stakeholders, managers and expert within water supply at the SPRING open-end users meetings, symposiums, seminars, workshops and conferences.
  - Multi-stakeholder learning alliances for institutionalizing in the SPRING community of practice (CoP).
  - The general public through SPRING webpage, brochure, radio and television shows and open seminars and project leaflets (which will be distributed broadly at different meetings and events), explanatory videos/media at key events.
  - Early stage researchers through organization of workshops



# Knowledge transfer at higher education level - 1

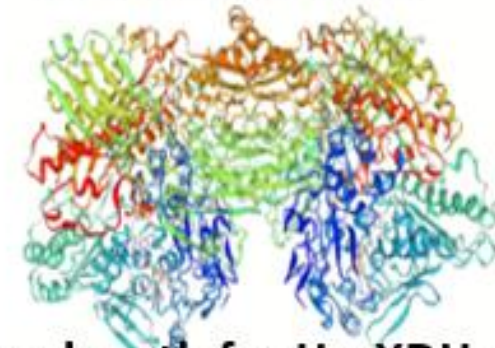
- Involvement of young researchers at Ph.D, post doctoral level in Project. Post-doc at
  - IITG development of advanced bio-oxidation system for oxidation of pollutants
  - IITKGP developing scale up process for producing biooxidating enzymes at commercial scale
- Master level theses connected with tasks.
- New courses: A new MSc launched at UiT in 2022
- New research projects: Academic partners have acquired new funding due to various new research topics identified in the course of the research

**Glucose oxidase**



**Gene length: 1815 bp; Protein: 605 kDa**

**Xanthine oxidase**



**Gene length for Hu-XDH: 4000 bp  
Protein: 157.8 kDa**

# Knowledge transfer at higher education level - 2



- PhD level projects to develop Microbial Sensory Platform for BOD and toxic compound detection - (PEC)

5 x PhD researchers registered at UiT and jointly supervised by:

1. DYPatil, Pune, on automated robotic system for blockages in sewer systems
2. Three researchers (SRKREC, India ) working on 'Exploring the Cloud computing-based Geo-spatial analysis' for change in land use, and creating decision support systems for selecting water management schemes in Indian context.
3. Developing real-time Control Systems for real-time monitoring (INESTEC)





# Upgrading of Infrastructure

- As a direct impact of SPRING, Water and Environment Technology (WET) Research Centre at SRKREC was upgraded to add new facilities for research
- College is in the process of setting up a business incubator focusing on rural entrepreneurship under the ACIC scheme of NITI Aayog for commercializing technologies on the platform of the ACIC.
- With the help of EU partners and the Indo Nordic EU Water Forum tech businesses relevant to the Godavari region will be brought to the region





# Capacity building output for SMEs

- Strengthening business presence in India
- Establishing new partnerships locally and with companies in India.
- Acquiring indispensable practical information on the legal and economic environment
- Setting up contacts with governmental and private entities
- Scientific dissemination (written and oral)

# New partnerships-1

- Enviroinvest started the incorporation of its associated Indian company to strengthen its activity in India.
- Enviroinvest Corp's startup company (Biopesticide Ltd) incorporated an associated Indian company (Biopestiphage Hindustan Pvt. Ltd), which built a research joint venture with IIT Guwahati.
- Enviroinvest signed a bilateral MOU with SRKR Engineering College and a trilateral MOU with SRKR Engineering College and Indo Nordic EU Water Forum.



# New partnerships-2

- Enviroinvest & Biopesticide took part in the business delegation led by the Minister of Foreign Affairs and Trade Hungary in New Delhi have built long-term relationships with Indian companies
- Enviroinvest built scientific and business relationships at scientific conferences and workshops





# Skills



This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No. 821423 and from The Department of Biotechnology, Government of India.



# Skill training



- SRKREC in collaboration with and GITAM University, organized a week-long hands-on training program where SRK organized water quality testing using advanced equipment and GIS and Remote Sensing for thematic map development for faculty members and PG students of various colleges in the region (21-27 Sep 22)
- Pallavi organized several online training events for general awareness about water pollution issues in collaboration with Vishwakarma University, Haryana, the first Skills university in India during 2020 and 2021
- FWF, Pallavi & Elixir organized training day at Water treatment plant, Gandhinagar. Signed MoU with Chairman INEUWF and Gujarat Jal board for training and collaboration, 26 March 2022.
- DyPatil, Pallavi & Elixir organized technology demonstration and early training at Mulla mutha river in collaboration with MIT Pune, 24-25 May 2022





# Organisational



This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No. 821423 and from The Department of Biotechnology, Government of India.





# Organisational - Policy-making

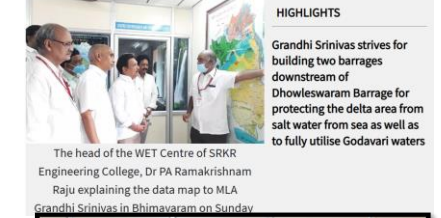
SPRING organised and participated in a number of events and meetings to inform officials at different levels to secure their cooperation as well as implementation of policies

- Prof Raju - SPRING was invited in a state level round table meeting held on 19th July 2021 at Vijayawada, AP
- Ecological governance Kolleru Lake (Ramsar Wetland) Irrigation Advisory Council meeting on 29th Nov. 2021 at Eluru.
- Advisory to District politicians in the context of re-organisation of districts in AP in 2022. The district magistrate, irrigation department and state level engineering functionaries consult SRKREC for environment and natural resource based advisory.
- Thematic maps developed in SPRING project helped to get a resource-based view on the impact of bifurcation and location of the district headquarter and subsequent transfer of administrative blocks to West Godavari district. Bhimavaram confirmed as the district headquarter. Village panchayats in AP and Maharashtra
- Meeting with Mr PV Satyanarayana, the AP state governor for Water Resources Policy
- Mr Amit Shukla, Director, Ministry of Jal Shakti, Government of India, Mr Jukka Ilomaki, Counsellor, Trade and Investment, Embassy of Finland
- MoU between INEUFW with Jal Board, Gujarat for advising on water and water policy governance issues.



**Bhimavaram: MLA seeks experts' advice on construction of barrages**

The Hans India  
Hans News Service | 21 Mar 2021  
11:36 PM IST







# *Societal*



This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No. 821423 and from The Department of Biotechnology, Government of India.



# Societal - Consensus building

1. Public awareness campaign: Webinars arranged on International Water Day 2021, 2022.
2. Awareness creation for water issues amongst Stakeholders meetings held in Bhimavaram and Varanasi
3. Meeting with paddy farmers, shrimp farmers, Irrigation and sanitation department was held on 6th Dec 2021 to debate water governance, technology implementation and civil responsibility
  - Outreach activities: Representing SPRING at water awareness events at MIT Pune, the Jal Jivan mission event organised by Ahmadabad Jal Board, Gujarat
  - Dissemination information by posters, print media and electronic media.



# Societal - Ground level connect

- **Communities and researchers worked together for mapping of Study Sites**
- Consortium partners meet villagers and visit pollution hotspots  
Stakeholder meet at Bhimavaram from 23, 24th November 2022



## Awareness events at Varanasi, Pune and Bhimavaram for water issues, governance and good policies.



Dr. RAJNISH CALAY ADDRESSING THE STAKEHOLDERS



CITIZENS FROM DIVERSE BACKGROUND



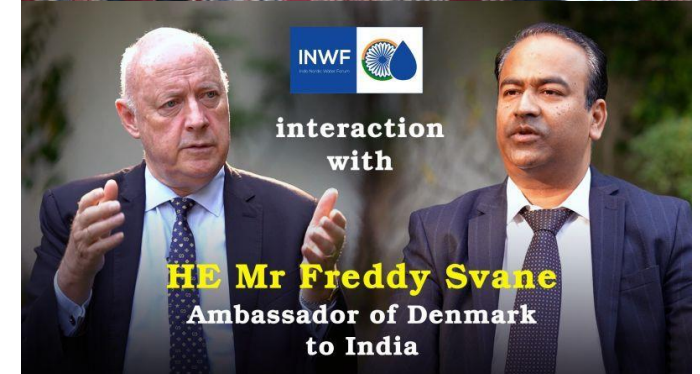
Interaction with SHRIMP FARMERS



FARMERS, CITIZENS AND POLICY MAKERS WITH THE EU-PARTNERS, Nov22

# INEUWF & SPRING Water Summit

- INEUWF a virtual platform is a key output to bring together water stakeholders from India and Europe, which was launched at the SPRING Water Summit in Delhi (9-10 March 23).
- Dignitaries; Ambassador of Finland Ms Ritva Koukku-Ronde and Ambassador of Norway Mr Hans Jakob Frydenlund, Mr Bharat Lal, Director General of the National Centre for Good Governance and Additional Secretary, Ministry of Jal Shakti, GOI, Ms Kamilla Kristensen Rai of the EU delegation and Elisabeth Strand Vigtel Counsellor for ST& HE Innovation Norway.
- Companies like Tata Cleantech Capital, Nokia, Abloy and ed Vishvaraj Enviro presented and many SME attended the B2B session.
- Ambassador of Denmark invited INEUWF for a meeting to discuss Danish companies' participation in the forum



# Summary of Demonstration Activities



- SPRING Awareness/Extension Campaign and early demos – 24-25 May, MIT, Pune – PAL / DY PATIL / ELIXIIR / MIT / FWF (2022)
- IWA Water Safety Conference, June 2022, Narvik – workshop and partner meeting - UiT
- IWA Conference, Copenhagen, September 2022 – SPRING presence – FWF/UiT
- SPRING Water Summit Forum 9-10 March 2023 – FWF/PAL/UiT
- Launch of INEUWF - a hub for continuation, further development & commercialisation of SPRING outcomes – PALAVI/FWF
- Education/Training needs for local operators organised through PALAVI/INEUWF – offered as online material through partner organisations

## Upcoming Capacity building activities

- Launch of training/education development program – water utilities, etc, India 2023/2024 – FWF/PAL
- Second Water Summit – Jan 2024
- Business Plan for commercial viability & sustainability – June 2024



# Thank You



This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No. 821423 and from The Department of Biotechnology, Government of India.

