NaWaTech

Natural Water Systems and Treatment Technologies to cope with Water Shortages in urbanised Areas in India

EC Grant Agreement no: 308336
DST Sanction Order: DST/IMRCD/NaWaTech/ 2012/(G)

SEVENTH FRAMEWORK PROGRAMME
EU -India cooperation in water technology and management

Department of Science and Technology

SEVENTH FRAMEWORK PROGRAMME

A project co-financed by the Department of Science and Technology of the Government of India and the European Commission

www.nawatech.net

Outlook

- **Introduction to NaWaTech**
  Pawan K. Labhasetwar + Mirko Haenel
- **NaWaTech Video**
- **Updated information on the 6 implementation sites**
  Dayanand Panse, Girish R. Pophali, Sayali Joshi
- **Safety and O&M Planning**
  Guenter Langergraber
- **NaWaKit + Business development + trainings**
  Martin Wafler
- **Community of Practice**
  Pranav Nagarnaik
- **Panel with project implementation partners**
- **Summary + post-project activities**
  Pawan K. Labhasetwar

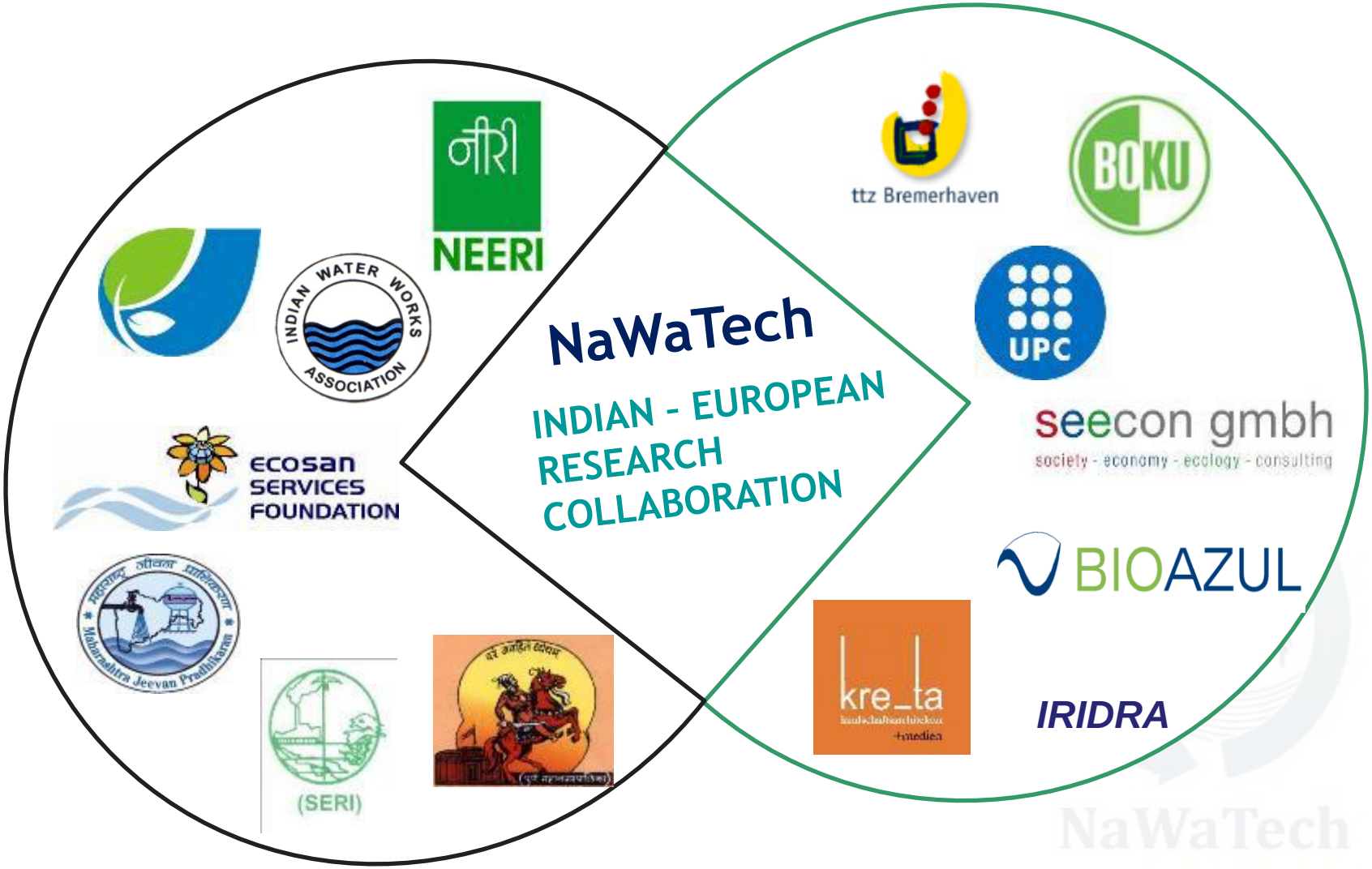
NaWaTech

Introduction to NaWaTech

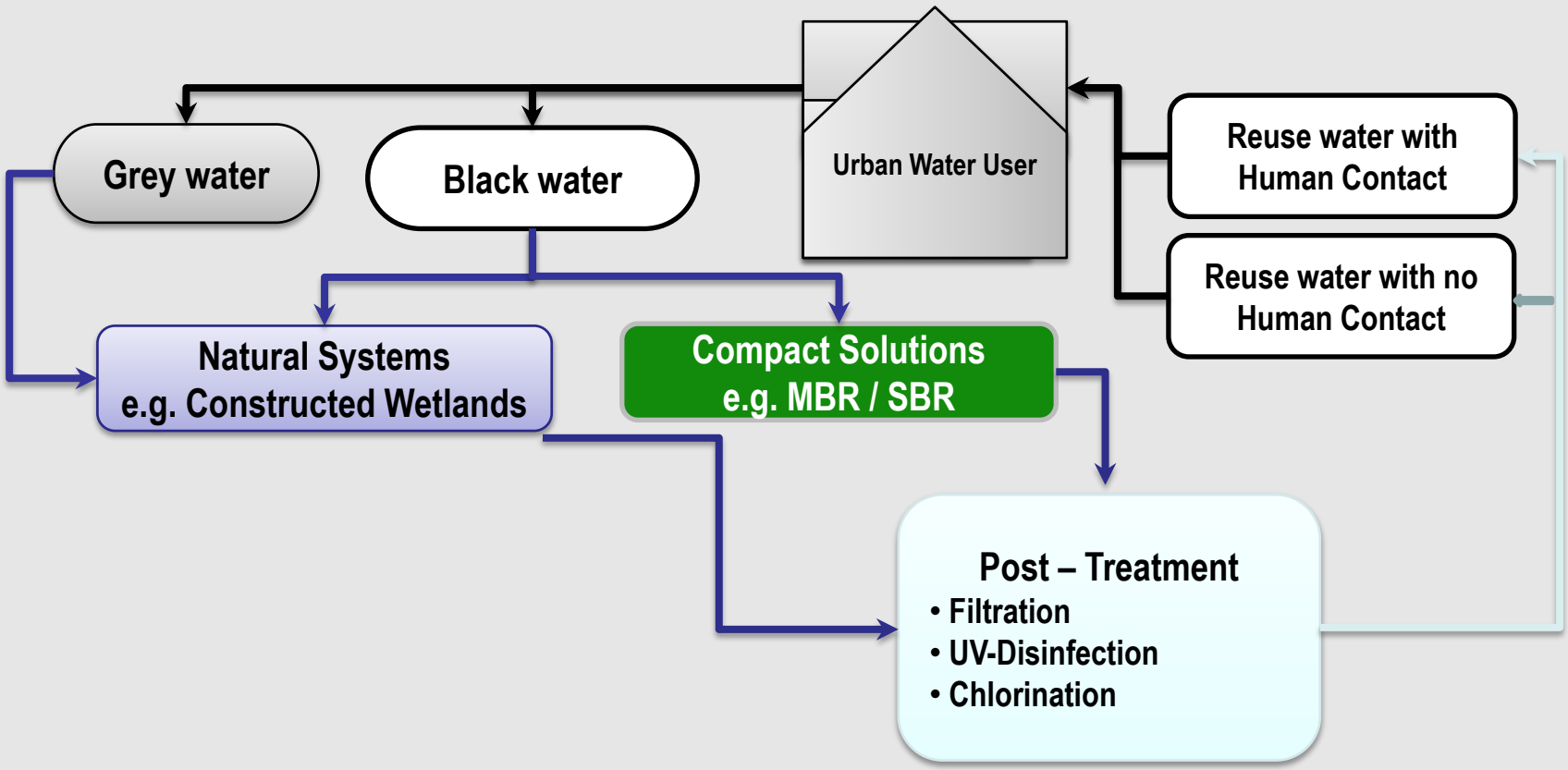
Overall objective

To enhance natural and technical water treatment systems such as constructed wetlands, soil aquifer treatment and bank filtration in order to develop a technically cost-efficient and robust water management system to cope sustainably with water shortages in urban areas of India.

Introduction to NaWaTech

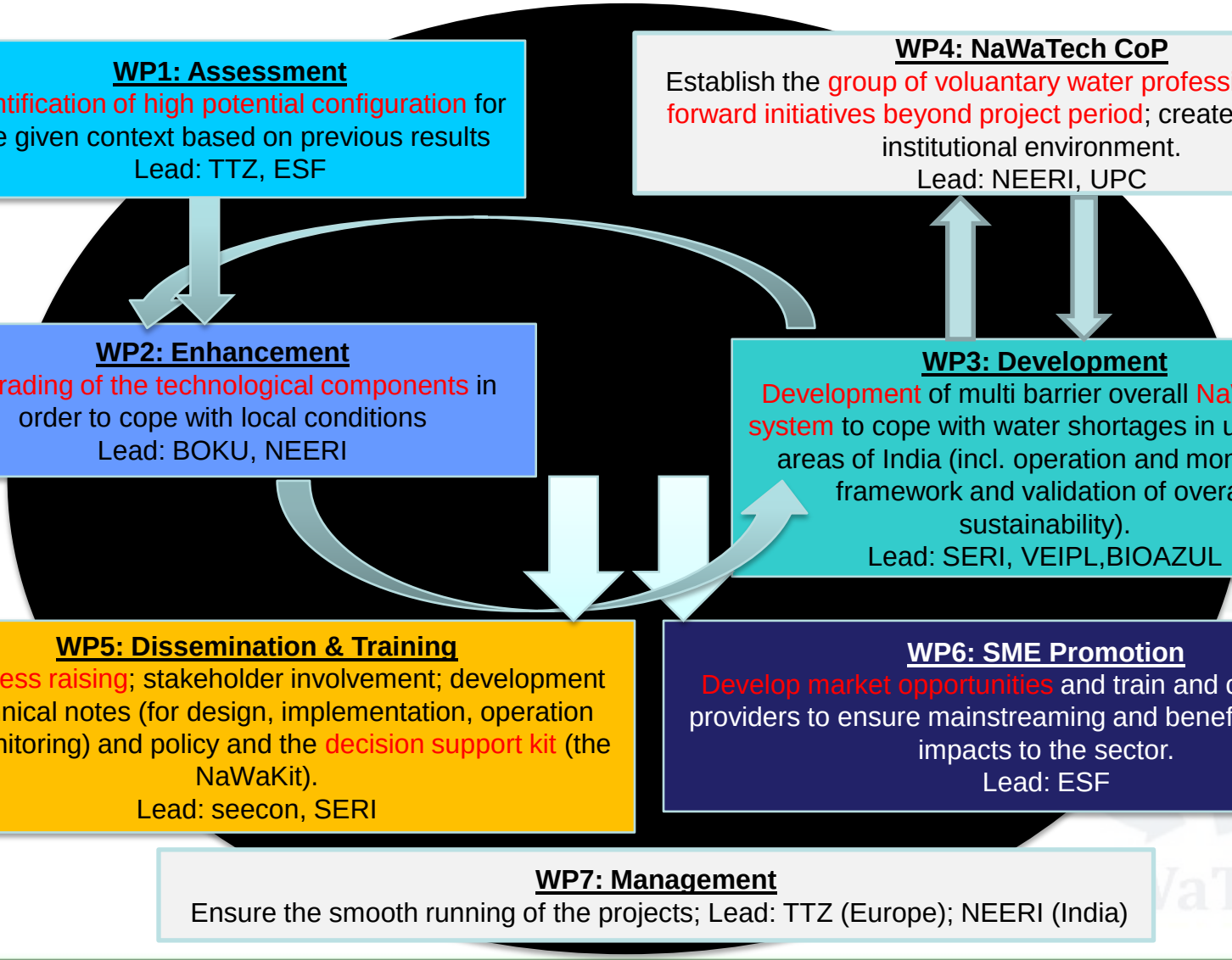


NaWaTech concept



NaWaTech Concept is based on optimised use of different urban water flows by means of multi-barrier approach

Workplan



WP1: Assessment
Identification of high potential configuration for the given context based on previous results
Lead: TTZ, ESF

WP4: NaWaTech CoP
Establish the group of voluantary water professionals to carry forward initiatives beyond project period; create and enabling institutional environment.
Lead: NEERI, UPC

WP2: Enhancement
Upgrading of the technological components in order to cope with local conditions
Lead: BOKU, NEERI

WP3: Development
Development of multi barrier overall NaWaTech system to cope with water shortages in urbanized areas of India (incl. operation and monitoring framework and validation of overall sustainability).
Lead: SERI, VEIPL,BIOAZUL

WP5: Dissemination & Training
Awareness raising; stakeholder involvement; development of technical notes (for design, implementation, operation and monitoring) and policy and the decision support kit (the NaWaKit).
Lead: seecon, SERI

WP6: SME Promotion
Develop market opportunities and train and coach service providers to ensure mainstreaming and beneficial economic impacts to the sector.
Lead: ESF

WP7: Management
Ensure the smooth running of the projects; Lead: TTZ (Europe); NEERI (India)

Preparatory work 1

NaWaTech Compendium

- **7 Chapters**
- **23 Technology Factsheets**
  - Water Sources (3)
  - Water Use (1)
  - Wastewater Treatment (15)
  - Recharge / Reuse (4)

- Available online at http://nawatech.net/

Preparatory work 2

Research in Europe

- Pilot-scale experiments with CWs at UPC
- Feasibility study for Short Crop Rotation plantation (ttz)
- Development of the concept for NaWaTech Safety & O&M Planning (BOKU)

Research in India

- Research questions and plans developed specifically for each implementation sites

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NaWaTech

Implementation sites

- **Implementation of NaWaTech treatment system at 6 sites (5000 p.e.)**

Staff Colony
Ordnance Factory Estate, Ambajhari
Capacity: 100 m^3/day (1000 p.e.)

NAGPUR

Common Recreation Areas / Gardens
NIT Garden at Dayanand Park
Capacity: 100 m^3/day (1000 p.e.)

High Rise Residential Complex
Amnora Park Apartments
Capacity: 40 m^3/day (400 p.e.)

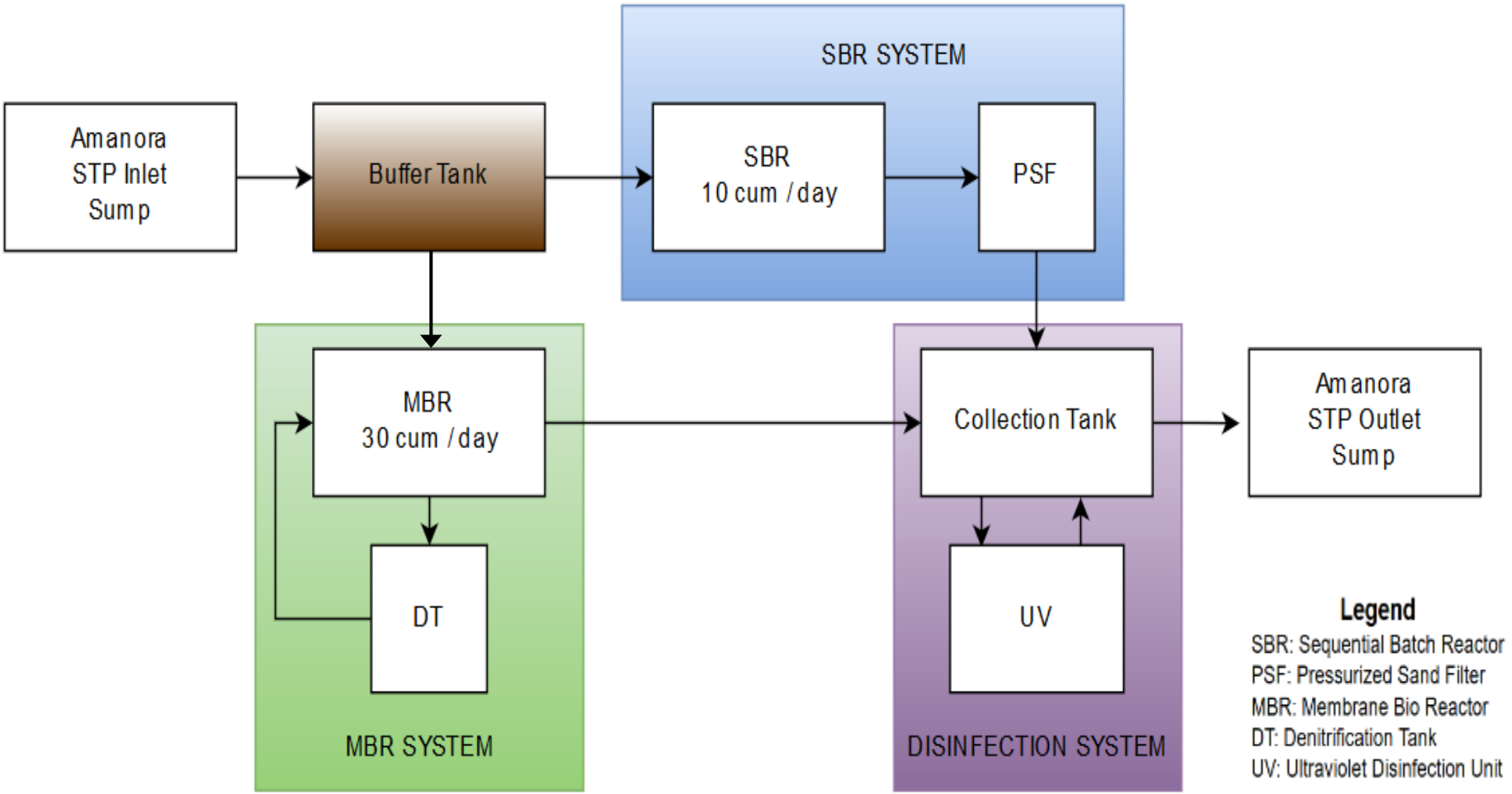
PUNE

Nullah / Open Sewer
Indradhanushva Environ. &
Citizenship Center, Dattavadi
Capacity: 40 m^3/day (400 p.e.)

College / University Housing Facility
Boys Hostel, College of Engineering
Capacity: 180 m^3/day (2000 p.e.)

+ Office building
MJP office
Pilot demonstration

1 Amanora Park Town



1 Amanora Park Town

Compact Technical Modules Implemented –
Sequential Batch Reactor (SBR) and Membrane Bio Reactor (MBR)

1 Amanora Park Town

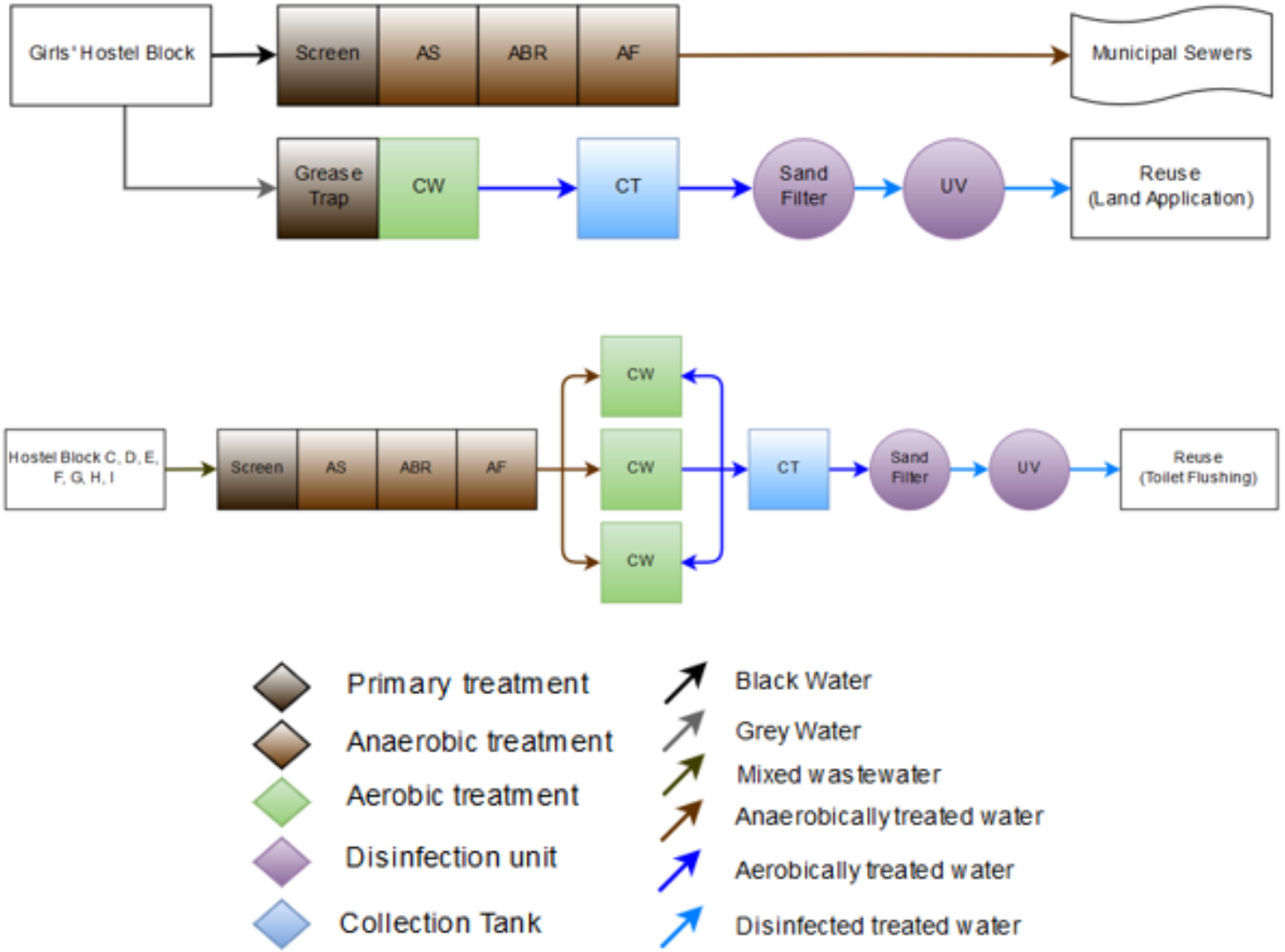
Residential Towers supplying wastewater to SBR-MBR

Location of compact technical modules SBR-MBR

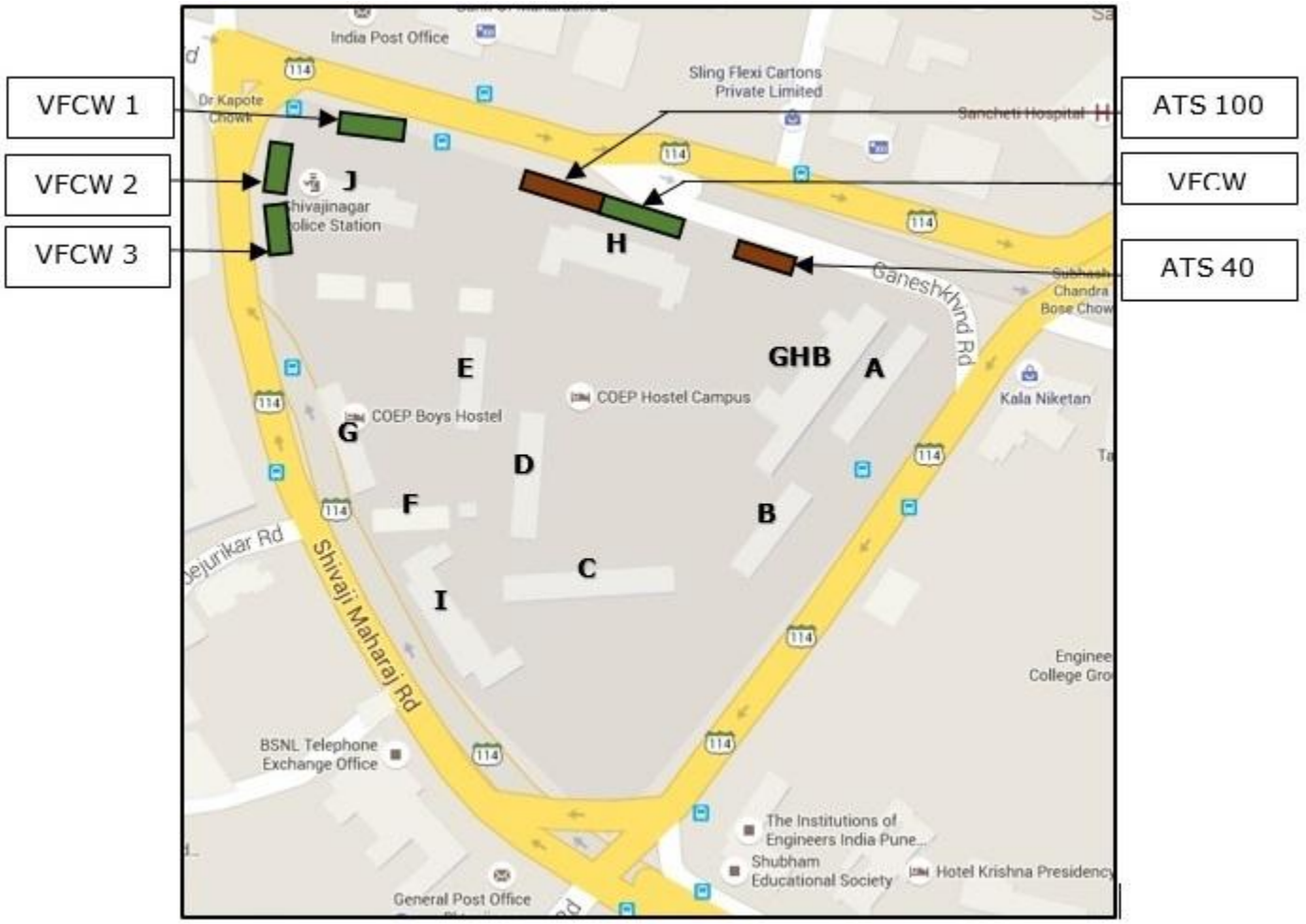
1 Amanora Park Town

Sr. No.	Parameter	Unit	Inlet	Outlet (MBR)	Outlet (SBR)
1.	pH	-	7.1	7.5	7.4
3.	Biological Oxygen Demand (BOD_3) at 27^0C	mg/l	149	11	21
4.	**Chemical Oxygen Demand (COD)**	**mg/l**	**368**	**43**	**33**
5.	Total Suspended Solids (TSS)	mg/l	156	28	38
6.	Sulphates as SO_4	mg/l	14.6	4.6	12.3
7.	Phosphates as PO_4	mg/l	2.6	0.28	0.60
8.	Nitrates as NO_3	mg/l	1.3	0.6	1.8
9.	**Ammonia as NH_3**	**mg/l**	**18.2**	**0.8**	**5.6**
10.	Total Kjeldahl Nitrogen as N	mg/l	26.1	2.2	4.1
12.	Dissolved Oxygen	mg/l	0	3.9	3.0
13.	Coliform MPN	/100 ml	>1600	27	

2 COEP Hostel Campus



2 COEP Hostel Campus



2 COEP Hostel Campus

DTS 100 (under construction)

DTS 100 (commissioned)

2 COEP Hostel Campus

Vertical Flow Constructed Wetlands (VFCW 1 and 2)

2 COEP Hostel Campus

Sr. No.	Parameter	Unit	Anaerobic Treatment System for Black Water (40 m^3/day) – primary treatment only		Vertical Flow Wetland for Grey Water (40 m^3/day)		Anaerobic + Constructed Wetland for Sewage (100 m^3/day)	
			Inlet	Outlet	Inlet	Outlet	Inlet	Outlet
1.	pH	-	6.6	6.8	6.4	7.3	6.6	7.7
2.	Biological Oxygen Demand (BOD_3) at 27^0C	mg/l	248	69	48	6	168	8
3.	**Chemical Oxygen Demand (COD)**	**mg/l**	**617**	**167**	**111**	**21**	**420**	**28**
4.	Total Suspended Solids (TSS)	mg/l	186	60	56	12	220	14
5.	Dissolved Oxygen (DO)	Mg/l	0	0	3.4	6.4	1.4	5.3
6.	**Ammonia as NH_3**	**mg/l**	**55.9**	**41.7**	**53.6**	**< 0.12**	**149.4**	**6.8**
7.	Phosphates as PO_4	mg/l	23.6	22.2	3.0	< 0.6	22.9	1.2
8.	Total Kjeldahl Nitrogen (as N)	mg/l	65.6	57.0	46.3	2.1	134.8	6.1
9.	Total Oil & Grease	mg/l	46.4	8.9	8.4	< 5	21.6	< 5
10.	Total Dissolved Solids	mg/l	432	538	172	276	356	516
11.	Coliform MPN	/100 ml	> 1600	> 1600	> 1600	920	> 1600	> 1600
12.	E. coli	CFU/100 ml	> 1600	> 1600	> 1600	400	> 1600	500

3 MJP Office

Vertical garden for treating greywater from an office building

3 MJP Office

- **Satisfactory treatment performance**
  - filter material: cocopeat
  - approx. 1 m^2 of wall per person needed for restricted irrigation reuse; complete disinfection is not guaranteed for unrestricted reuse
- **Economically feasible**
  - payback time: about 10-12 years

Short communication accepted in *Journal of Water, Sanitation and Hygiene for Development*

NaWaTech

4 Indradhanushya Center

Ambil stream contaminated with sewage till confluence with Mutha River.

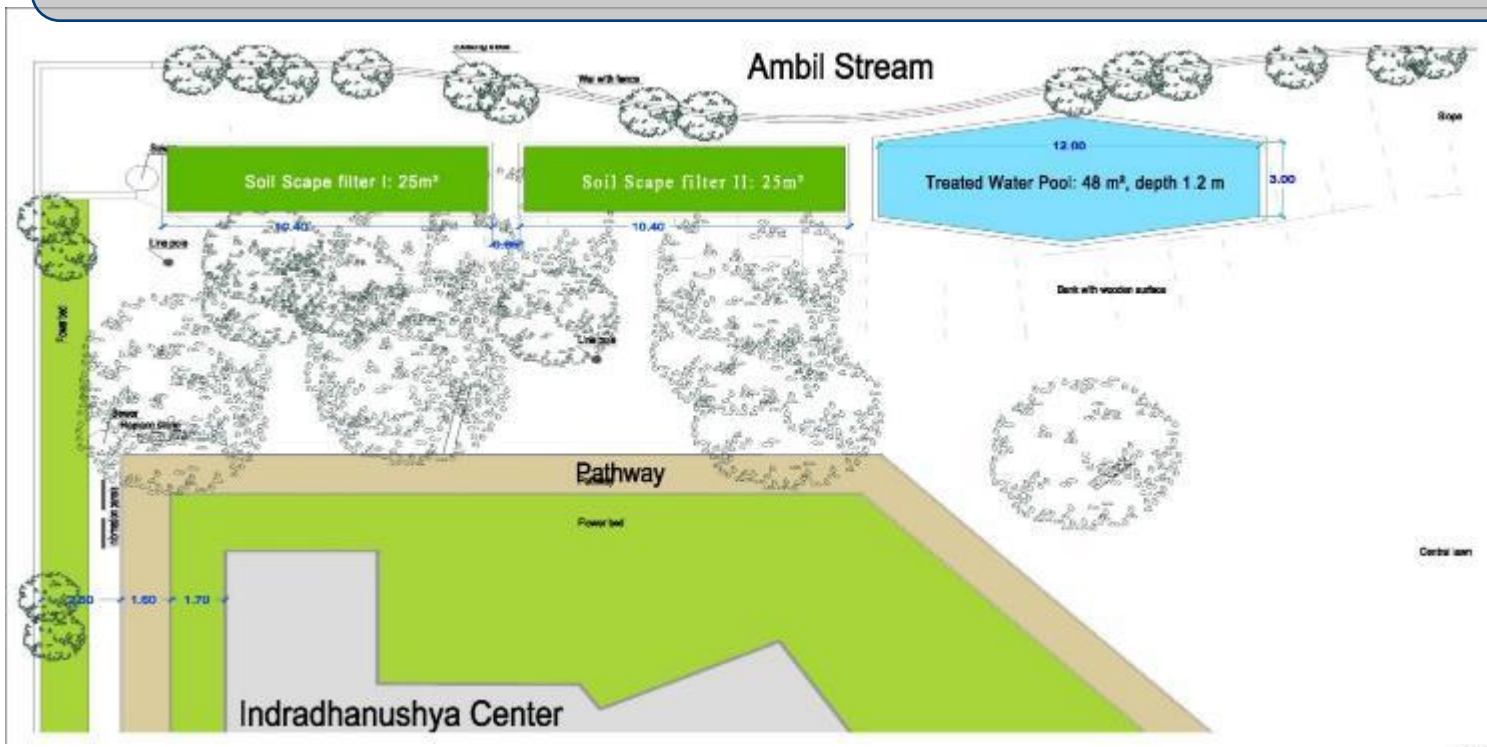
Water from Ambil stream is treated with Eco-filtration Bank (EFB) system for use in the museum gardens.

Capacity: ca. 40 m³/d

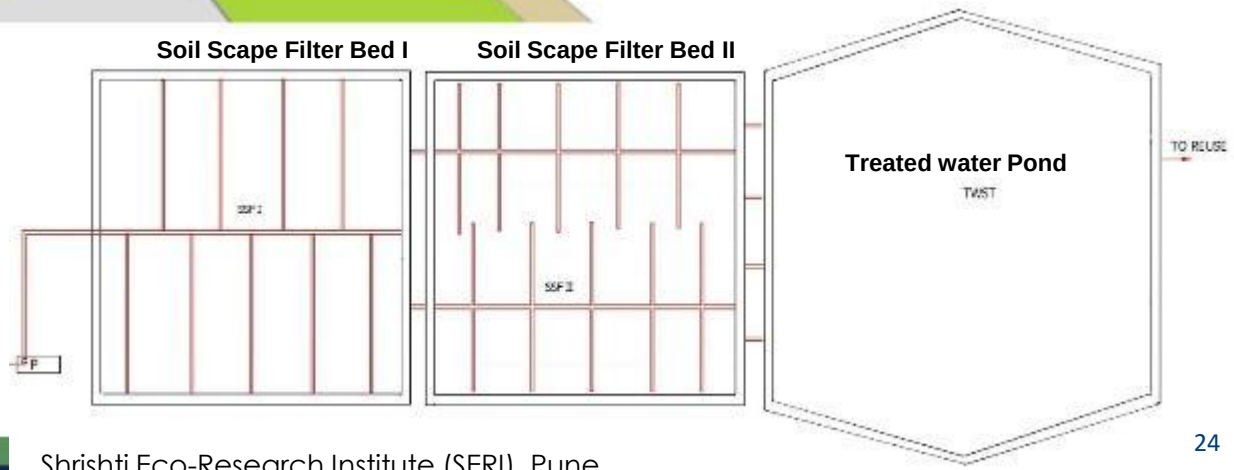
Eco-filtration Bank (EFB) comprises

- Intake well,
- 2 Soil Scape Filters
- Treated water pond

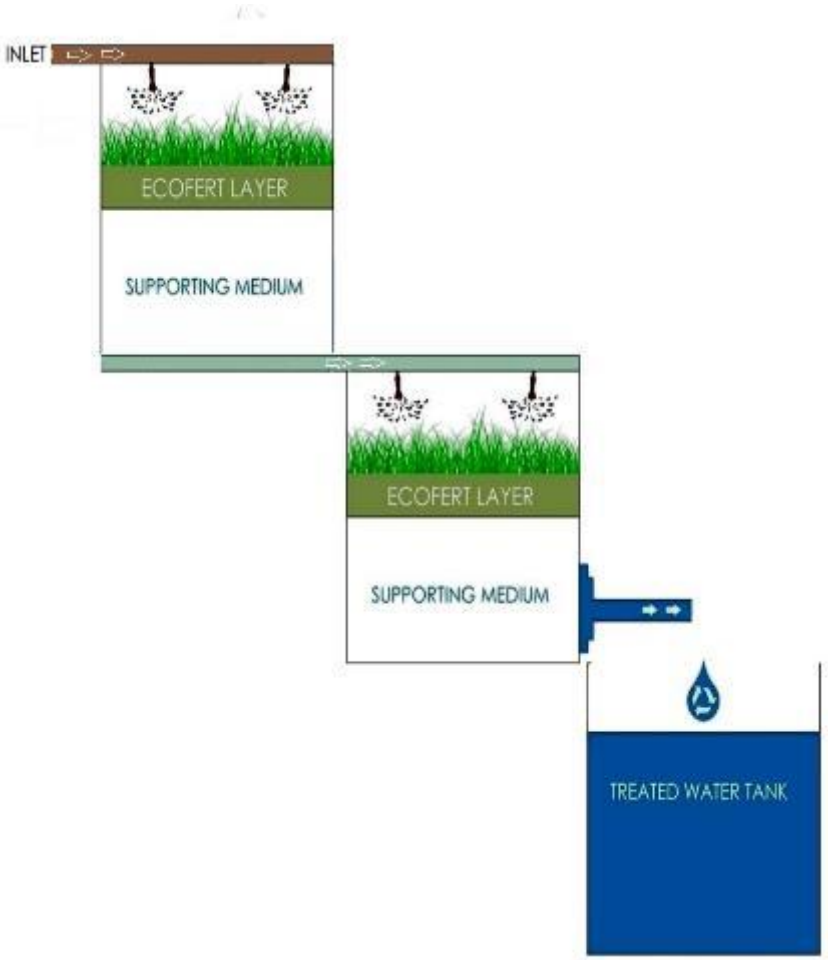
4 Indradhanushya Center



Top View of the Treatment system



4 Indradhanushya Center




Soil Scape Filter I


Soil Scape Filter II


Treated Water Tank


Overflow valve
Valve for Cleaning activity

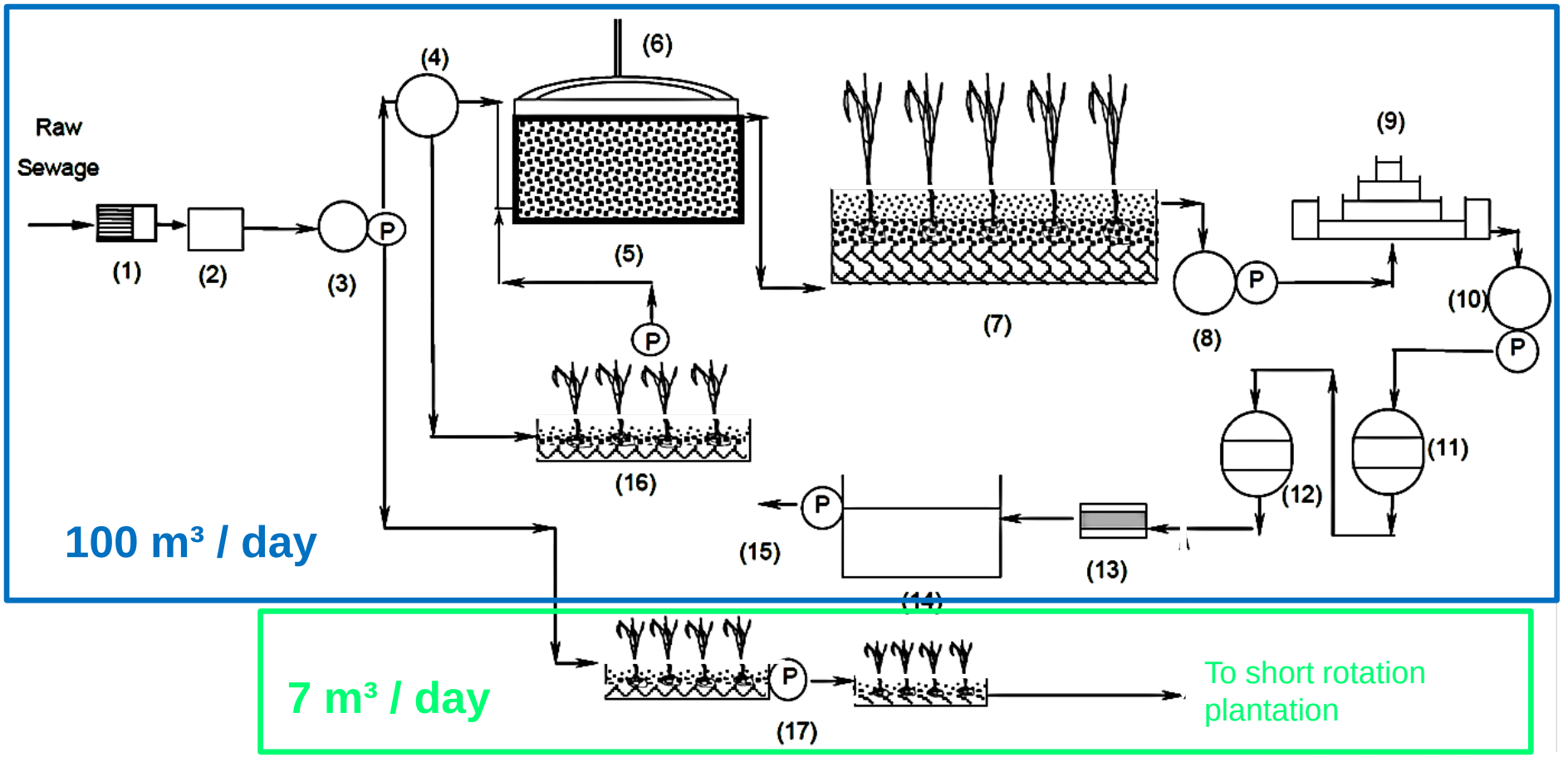
(SERI)

4 Indradhanushya Center

- ✓ About 40 CMD water available for landscaping and toilet flushing purposes
- ✓ Enhances aesthetical view of the gardening
- ✓ Role model to show reuse of wastewater flowing through city's drains / streams

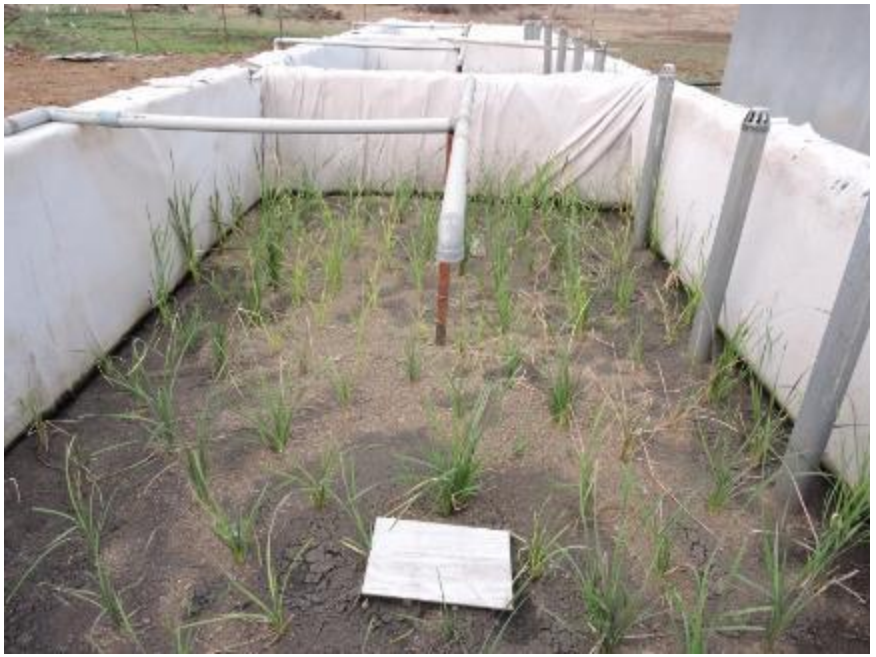
5 Ordnance Factory Estate, Ambajhari

Schematics of Treatment System for Domestic Sewage Management (100 m^3/day)




CONSTRUCTED
WETLAND


UPFLOW ANAEROBIC ATTACHED
GROWTH FILTER
PRIMARY
CLARIFIER



First results

pH:	6.8 – 7.0		(5.5 – 9.0)	
COD:	**200 – 350**	**[<20]**	**(250)**	**mg/L**
BOD:	100 – 150	[< 5]	(30)	mg/L
TSS:	200 – 300	[<10]	(100)	mg/L
TKN:	**20 – 40**	**[< 10]**	**(100)**	**mg/L**
TP:	2 – 6	[< 1]	(5)	mg/L
TDS:	300 – 500		(2100)	mg/L
Oil & Grease:	25 – 40 (<5)		(10)	mg/L

Values in **[ ]** indicate achievable effluent quality

5 Ordnance Factory Estate, Ambajhari

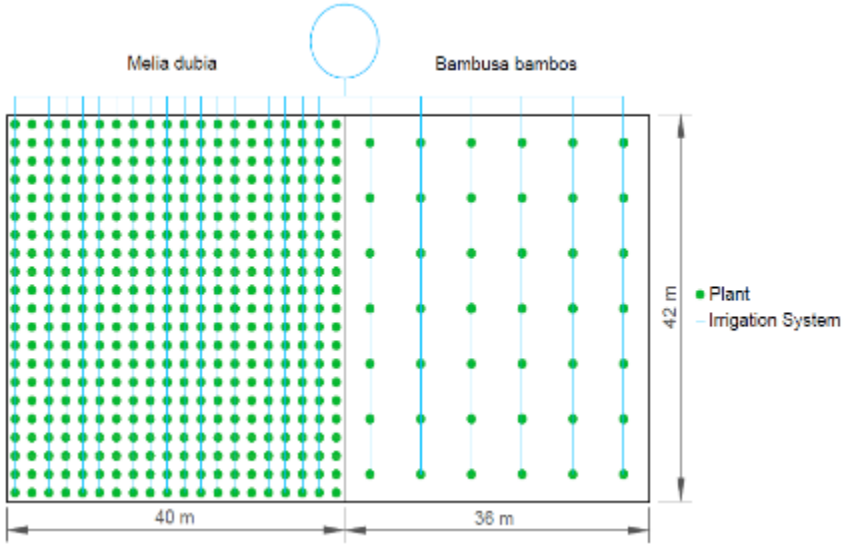
SHORT ROTATION PLANTATION (SRP)

Selection of most suitable fast growing tree species:

Melia dubia and *Bambusa bambos*.

Design of test site:

- about 1500 m² for each tree species
- Irrigated with treated wastewater



6 NIT Dayanand Park

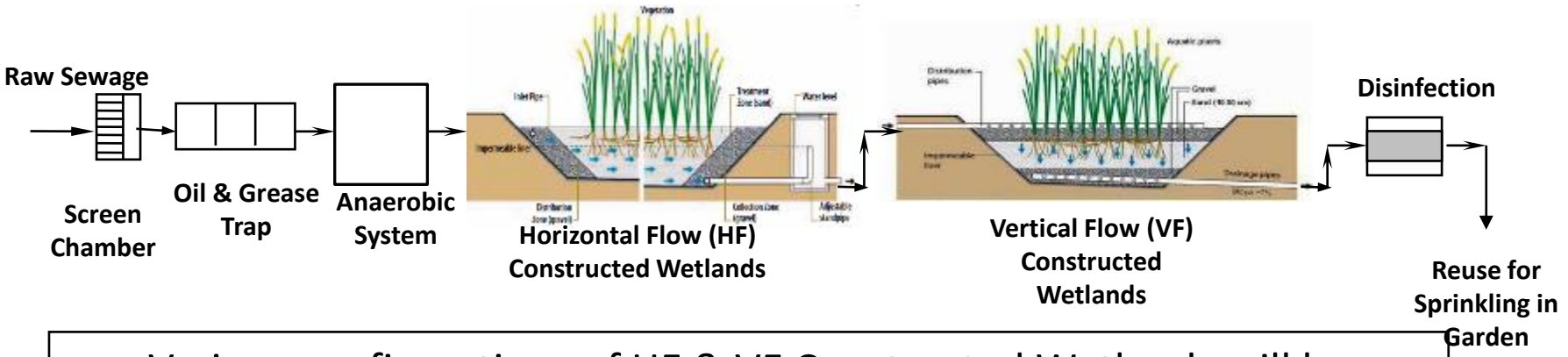
Salient Features

- 1500 – 2000 park users per day
- Water Requirement – 100 – 120 m^3/day for maintaining the garden
- Currently using water from near by open drain and ground water
- Proposed Treatment Capacity: 100 m^3/day
- Treated water proposed to used for gardening

Treatment System

- Two stage anaerobic system followed by
- Combination of HF & VF CWs
- Integration of technical design with landscape scenarios

6 NIT Dayanand Park



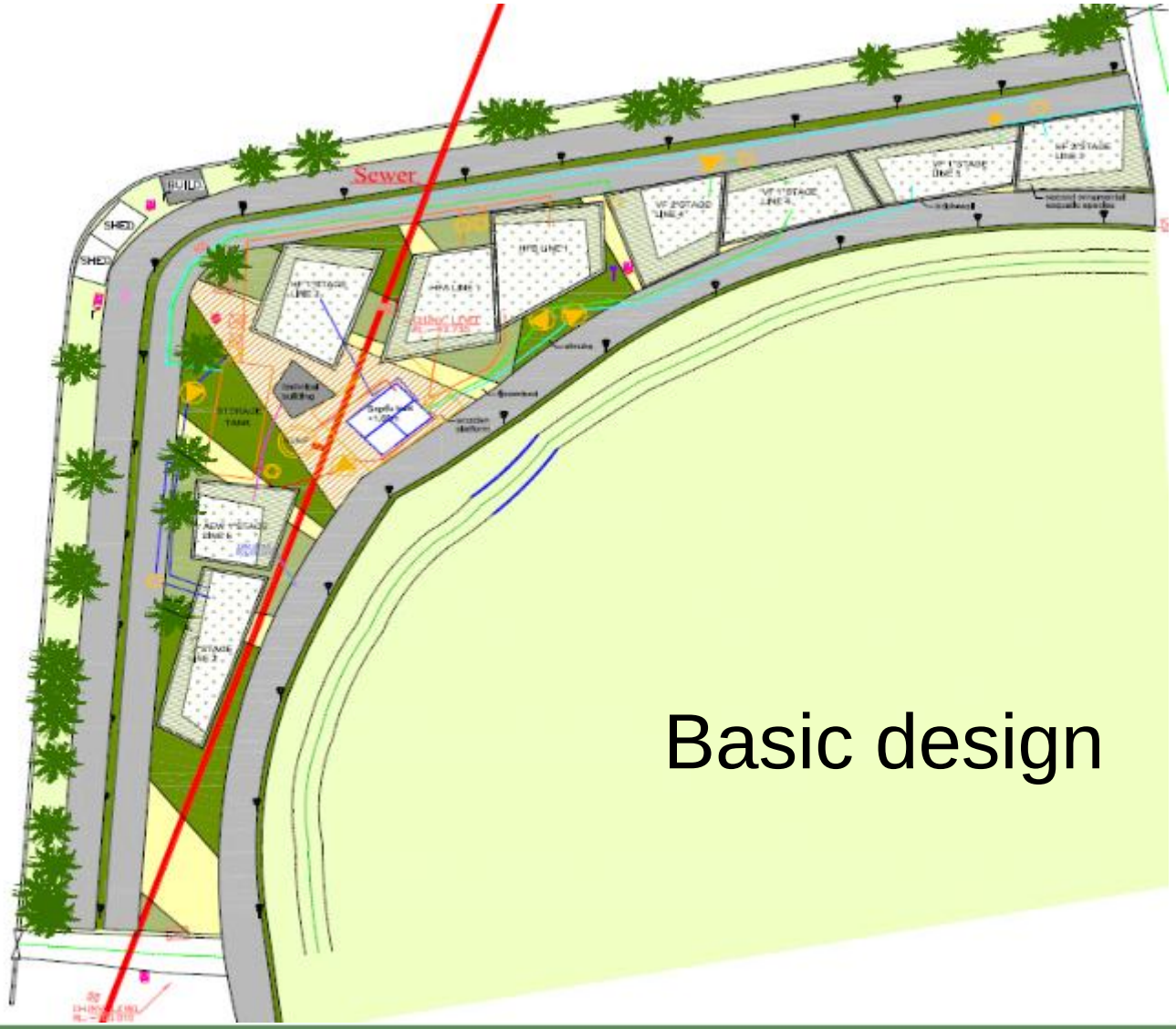
Various configurations of HF & VF Constructed Wetlands will be implemented in the treatment scheme

Wastewater Characteristics*		Expected Concentrations
pH	7.0 – 7.5	7.0 – 7.2
BOD	110 – 150	<10
COD	280 – 300	< 30
TSS	80 – 200	<10
Oil & Grease	25 – 35	<10
TKN	14 – 25	<10
Phosphate	2 – 6	<1

*All parameters except pH are in mg/ L

NaWaTech

6 NIT Dayanand Park



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NaWaTech

NaWaTech Safety and O&M Planning

Summary

- Sanitation systems only have the expected benefits to human health and environment if they work → **Operation and maintenance** required

- NaWaTech **Safety and O&M Planning approach** to support sustainable long-term operation of sanitation systems
  - Risk-based approach adapted from WHO Water and Sanitation Safety Planning
  - Basis to develop O&M schemes and materials

NaWaTech Safety and O&M Planning

Safety planning approach

Background

- **WHO Water Safety Planning approach**
  - WHO Guidelines for Drinking Water (2004)
  - Health of consumers in the center
  - To ensure this, proper O&M of water supply system is needed

NaWaTech

NaWaTech Safety and O&M Planning

Safety planning approach

with courtesy of
Kate Medlicott (WHO)

NaWaTech Safety and O&M Planning

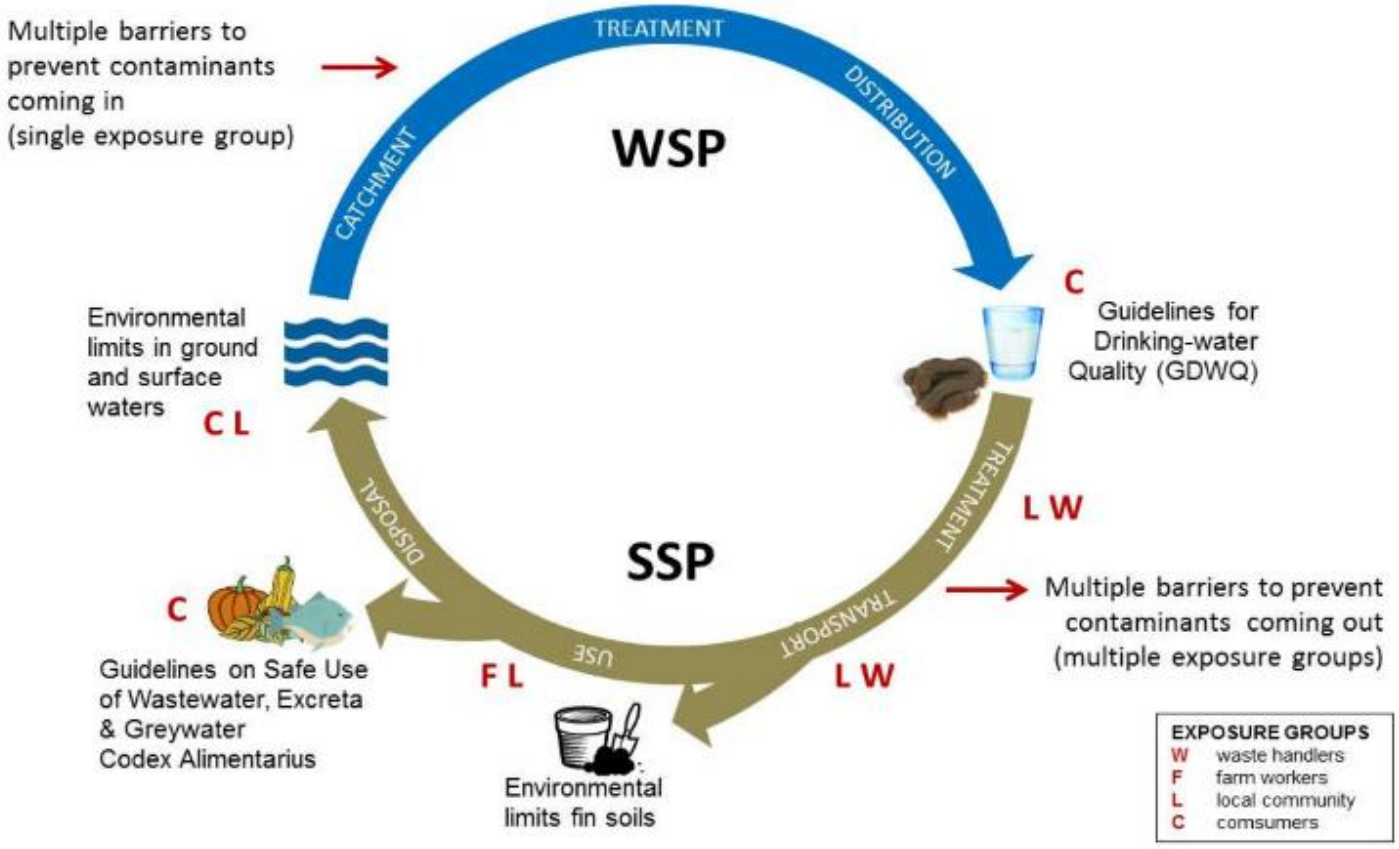
Safety planning approach

Background

- **WHO Water Safety Planning approach**
  - WHO Guidelines for Drinking Water (2004)
  - Health of consumers in the center
  - To ensure this, proper O&M of water supply system is needed
- **WHO Sanitation Safety Planning approach**
  - WHO Guidelines for the safe use of wastewater, excreta and greywater (2006)
  - Concept note published 2010, **Manual published 2015**
  - Sanitation service chain more complex (more stakeholders, different products and uses, work safety, etc.)

NaWaTech Safety and O&M Planning

Safety planning approach



with courtesy of
Kate Medlicott (WHO)

SANITATION SAFETY PLANNING

MANUAL FOR SAFE USE AND DISPOSAL OF WASTEWATER, GREYWATER AND EXCRETA

World Health Organization

NaWaTech Safety and O&M Planning

- NaWaTech pilots (up to 2000 PE served, only WWTP) are small compared to the sanitation system of whole city (Pune: 5 Mio people) → WHO approach not applicable
- Assuming a well designed system as a starting point that benefits to human health and environment → proper O&M guarantees that benefits to human health and environment will be achieved
- **Use Safety Planning approach as basis to develop O&M schemes → support guaranteeing a long-term operation of the implemented systems**

NaWaTech Safety and O&M Planning

5 Steps

Stakeholder mapping, definition of system boundaries & system description

↓

Identification of hazards and hazardous events → risk assessment and prioritization

↓

Definition of risk prevention and risk reduction measures (control measures)

↓

Monitoring measures

↓

Troubleshooting and communication plan

NaWaTech Safety and O&M Planning

Hazards: failure modes of treatment units and supporting units" (e.g. pumps, monitoring devices, etc.)

Hazardous events: circumstances favoring these mal-functions or failure modes

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NaWaTech Safety and O&M Planning

Risk Assessment

Score	Probability (P) (of the hazardous event)	Detectability (D) (of the hazard)	Severity (S) (of the consequence of the hazard)
1	< once in 5 year	Immediate (e.g. visual inspection)	Will not result in major system degradation and will not produce system functional damage
2	< once a month to once in 1 year	Stepwise (e.g. sampling required)	Will degrade system performance but can be counteracted or controlled without major damage
3	> once a month	No detection in normal operation; problem analysis is stepwise and complex	Will (severely) degrade system performance by substantial damage (component failure), interrupt system feeding, requiring immediate corrective action for system survival.

NaWaTech Safety and O&M Planning

What could be critical points for your O&M management?

"Risk" = Probability x Severity x Detectability

A risk is considered critical if

R > 7 OR P = 3 OR S = 3

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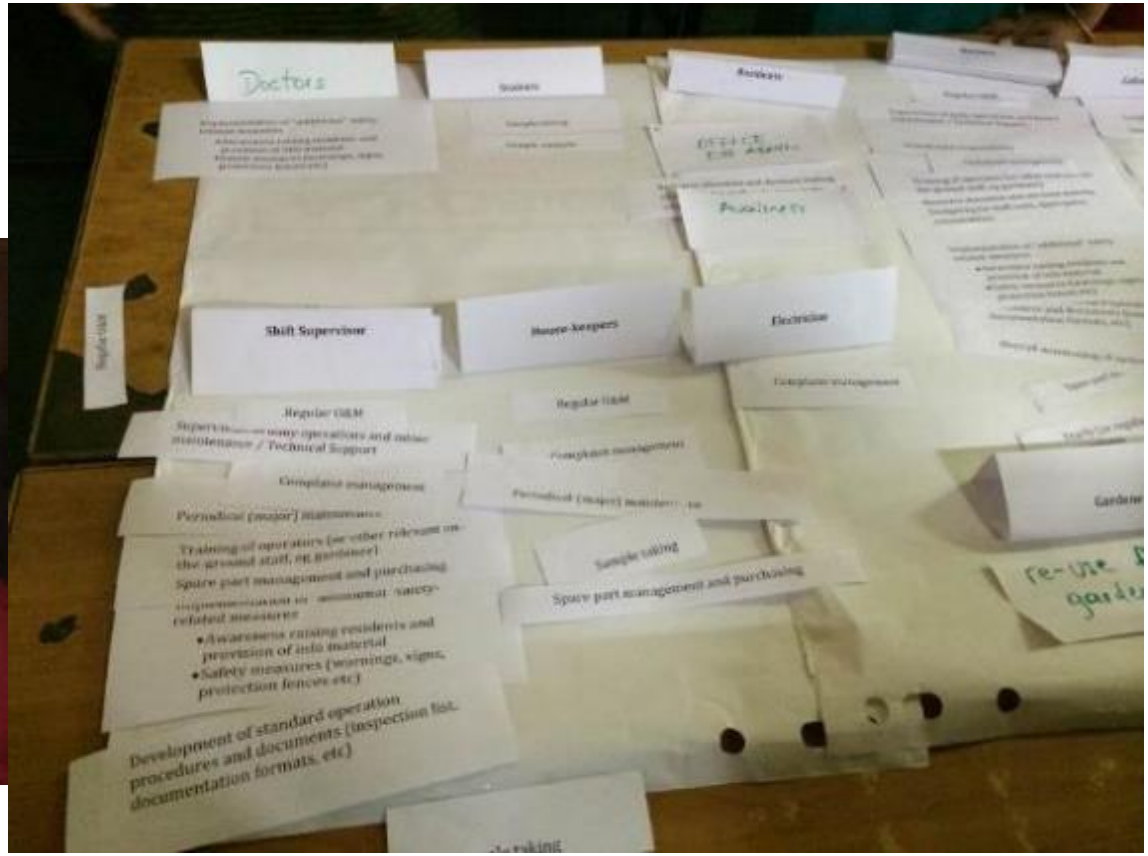
NaWaTech Safety and O&M Planning

Outcomes

Stakeholder workshops

Responsibilities for O&M

Who (operator/supervisor) is responsible for what?



NaWaTech Safety and O&M Planning

Outcomes

Results from hazards and risk assessment

Treatment Line	Implemented system	# components	# hazards	# critical hazards	Hazards with R≥7	Hazards with P=3	Hazards with S=3
Amanora 1	SBR	11	**88**	**51**	27	3	21
Amanora 2	MBR	10	**87**	**58**	22	3	33
COEP 1	Anaerobic pre-treatment + VF CWs (domestic wastewater)	11	**83**	**38**	19	6	13
COEP 2	VF CW (greywater)	7	**65**	**35**	18	4	13
OFAJ 1	Anaerobic pre-treatment + vertical up-flow CW	16	**106**	**47**	25	0	22
OFAJ 2	French reed bed	8	**66**	**24**	12	0	12

NaWaTech Safety and O&M Planning

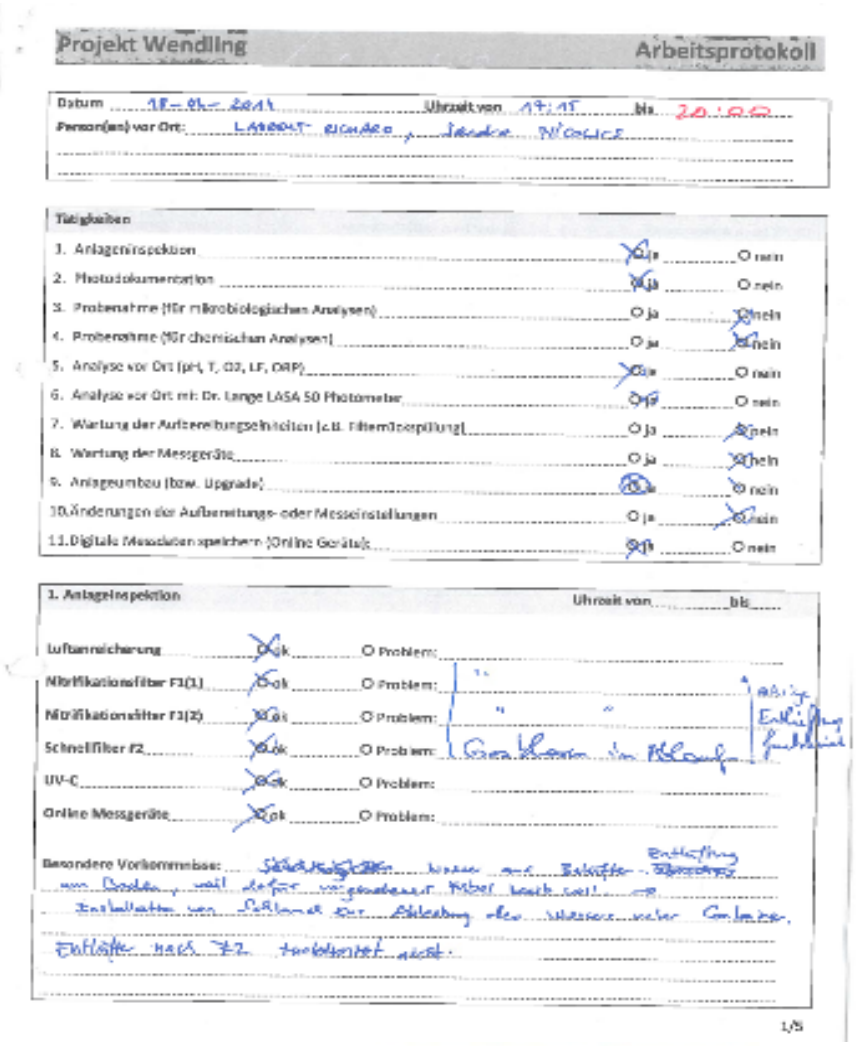
Outcomes

Operator-friendly O&M materials

e.g. checklists and workplans for operator and supervisors

Activity- and Timetable
WEEKLY ACTIVITIES

Target Date	Task Nr.	Activity	Schedule	Executing Person	Completed (Day/Time)	Signature Executing Person	Si
Checking the tool room							
	W1	Checking the completeness of the tools in the tool room	Every Week				
Checking of all taps at the consumers for leakages and damages							
	W2	Checking of tap at "Public water station Bukara"	Every Week				
	W3	Checking of tap at "Public water station Mkamo"	Every Week				
	W4	Checking of taps at the Health Center	Every Week				
	W5	Checking of taps at Primary School 1	Every Week				
	W6	Checking of taps at Primary School 2	Every Week				
	W7	Checking of taps at the Parish	Every Week				
	W8	Checking of taps at Future for Kids	Every Week				
Checking the tool room							
	W1	Checking the completeness of the tools in the tool room	Every Week				



Projekt Wendling — Arbeitsprotokoll

Datum 18. Okt. 2018 Uhrzeit von 17:15 bis 20:00

Person(en) vor Ort: LAMBERT Ricardo, Jacobs NICOLAS

Tätigkeiten

1. Anlageninspektion — ja — nein
2. Photodokumentation — ja — nein
3. Probenahme (für mikrobiologischen Analysen) — ja — nein
4. Probenahme (für chemischen Analysen) — ja — nein
5. Analyse vor Ort (pH, T, O2, LF, ORP) — ja — nein
6. Analyse vor Ort mit: Dr. Lange LASA 50 Photometer — ja — nein
7. Wartung der Aufbereitungseinheiten (z.B. Filtermembranen) — ja — nein
8. Wartung der Messgeräte — ja — nein
9. Anlagenumbau (bzw. Upgrade) — ja — nein
10. Änderungen der Aufbereitungs- oder Messeinstellungen — ja — nein
11. Digitale Messdaten speichern (Online Geräte) — ja — nein

1. Anlageninspektion — Uhrzeit von ____ bis ____

Lufteinmischung — ok — Problem:
Nitrifikationsfilter F1(1) — ok — Problem:
Nitrifikationsfilter F1(2) — ok — Problem:
Schnellfilter F2 — ok — Problem:
UV-C — ok — Problem:
Online Messgeräte — ok — Problem:

Besondere Vorkommnisse:

1/5

NaWaTech Safety and O&M Planning

Outcomes

Summary

- **Design adaptations** based on hazard identification in discussions with designers
- Fostering O&M **roles and responsibilities** in stakeholder workshops
- Prioritization of critical control and monitoring measures to be integrated in O&M work plans **for operators and supervisors** / skilled and unskilled workers

Additionally,

- Identify topics for trainings and system understanding
- "User-friendly" tools for O&M and prioritised activities
- Support budgeting for O&M

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NaWaTech

NaWaKit & Entrepreneurs Trainings

NaWaKit – Introduction

- **Online knowledge platform for water practitioners in India**
  http://www.sswm.info/category/step-nawatech/introduction

NaWaKit & Entrepreneurs Trainings

NaWaKit - Module 1: NaWaTech Basics

- Introduction
- 23 technology factsheets
- 5 case studies

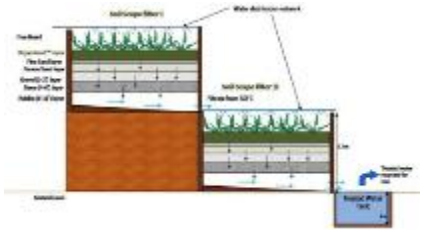
Catalogue of 23 NaWaTech technologies

CoEP Hostel and MJP - Pune

Ordnance Factory - Nagpur

AMANORA Park Town - Pune

Dayanand Park - Nagpur



Indradhanushya Museum - Pune

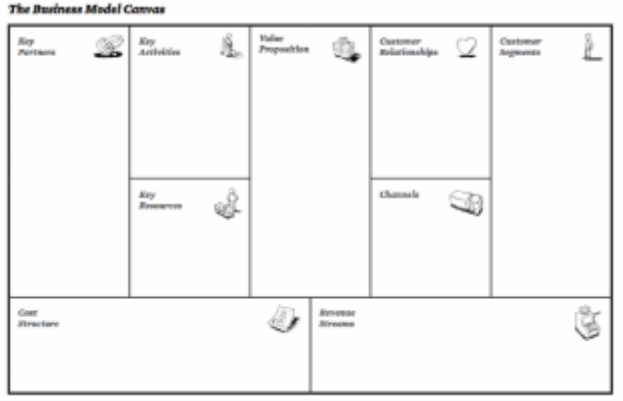
NaWaKit & Entrepreneurs Trainings

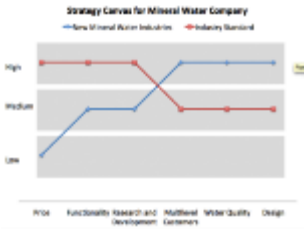
NaWaKit - Module 2: NaWaTech Business Development

Tools for …

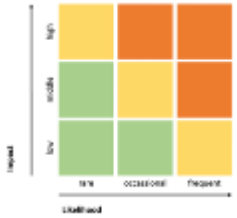
- Development of Business Models
- Business plan development
- Founding and managing a business

Business Model Canvas



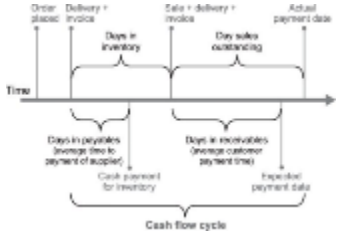


Blue Ocean Strategy

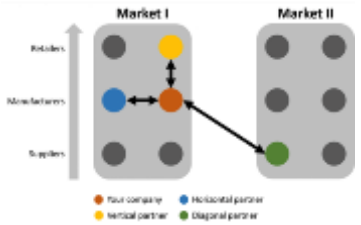


Risk Assessment Matrix

PESTELI Analysis



Cash Flow Cycle



Partners & Networks

NaWaKit & Entrepreneurs Trainings

NaWaKit - Module 3: A Guide for Successful NaWaTech Projects

- Technology Selection and Design
- Implementation of NaWaTech Projects
- Safety and O&M Management

NaWaKit & Entrepreneurs Trainings

NaWaTech Training of Entrepreneurs and SMEs

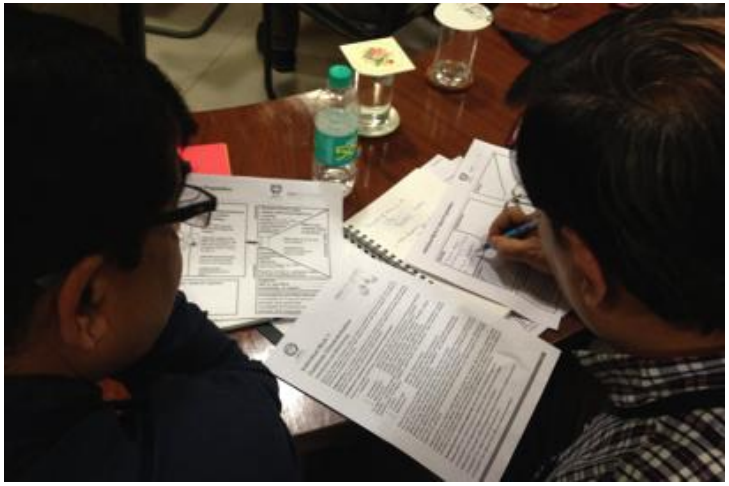
- 9th to 18th April 2015, Pune
- 17th to 20th August 2015, Nagpur

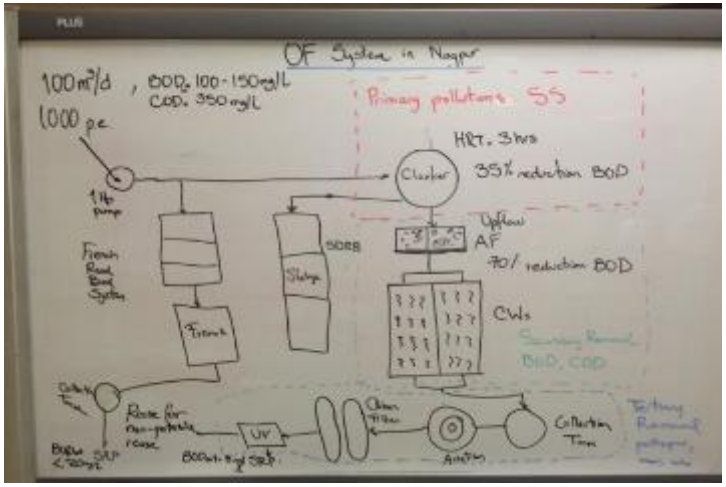
Group picture - Pune

Group picture - Nagpur

NaWaKit & Entrepreneurs Trainings

NaWaTech Training of Entrepreneurs and SMEs





Outlook

- **Introduction to NaWaTech**
  Pawan K. Labhasetwar + Mirko Haenel
- **NaWaTech Video**
- **Updated information on the 6 implementation sites**
  Dayanand Panse, Girish R. Pophali, Sayali Joshi
- **Safety and O&M Planning**
  Guenter Langergraber
- **NaWaKit + Business development + Trainings**
  Martin Wafler
- **Community of Practice**
  Pranav Nagarnaik
- **Panel with project implementation partners**
- **Summary + post-project activities**
  Pawan K. Labhasetwar

NaWaTech

Community of Practice (COP)

What is meant by CoP ?

- A collaborative network which shares a domain.
- All members engaged in the furtherance of a common goal
- Driven by the willing participation of their members.
- Engaged in sharing knowledge, building capacity, developing expertise, and solving problems.
- Timeline - max. 5 years

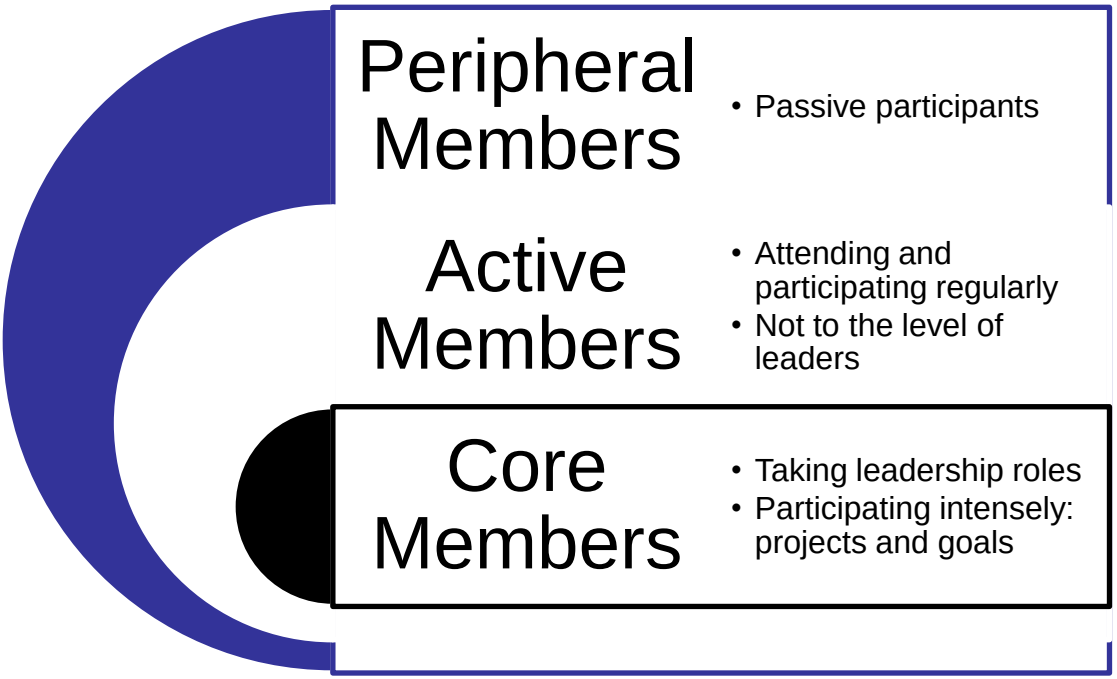
Community of Practice (COP)

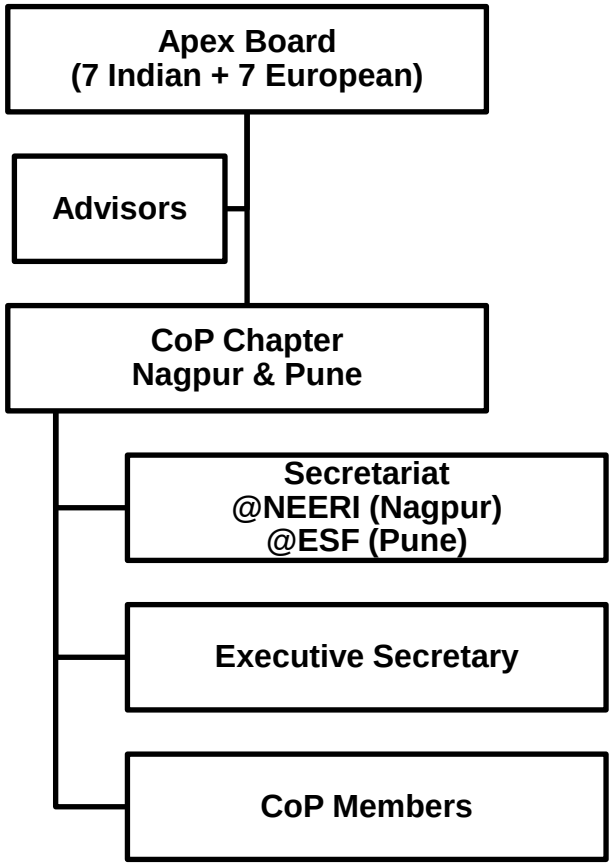
NaWaTech CoP – Objectives

- To promote innovation and entrepreneurship,
- To build an international network of stakeholders and learn from each other (face-to-face and virtually) and establish long term co-operations.
- To facilitate discussions, to support and to provide feedbacks and to strengthen and co-ordinate the dissemination activities of the project
- To promote the cause of natural water treatment systems as alternatives to conventional water management systems and share NaWaTech Project experience
- To create general awareness of the urban water cycle, including aspects such as effectiveness of the different solutions and economics, amongst others.

Community of Practice (COP)

NaWaTech CoP – Structure

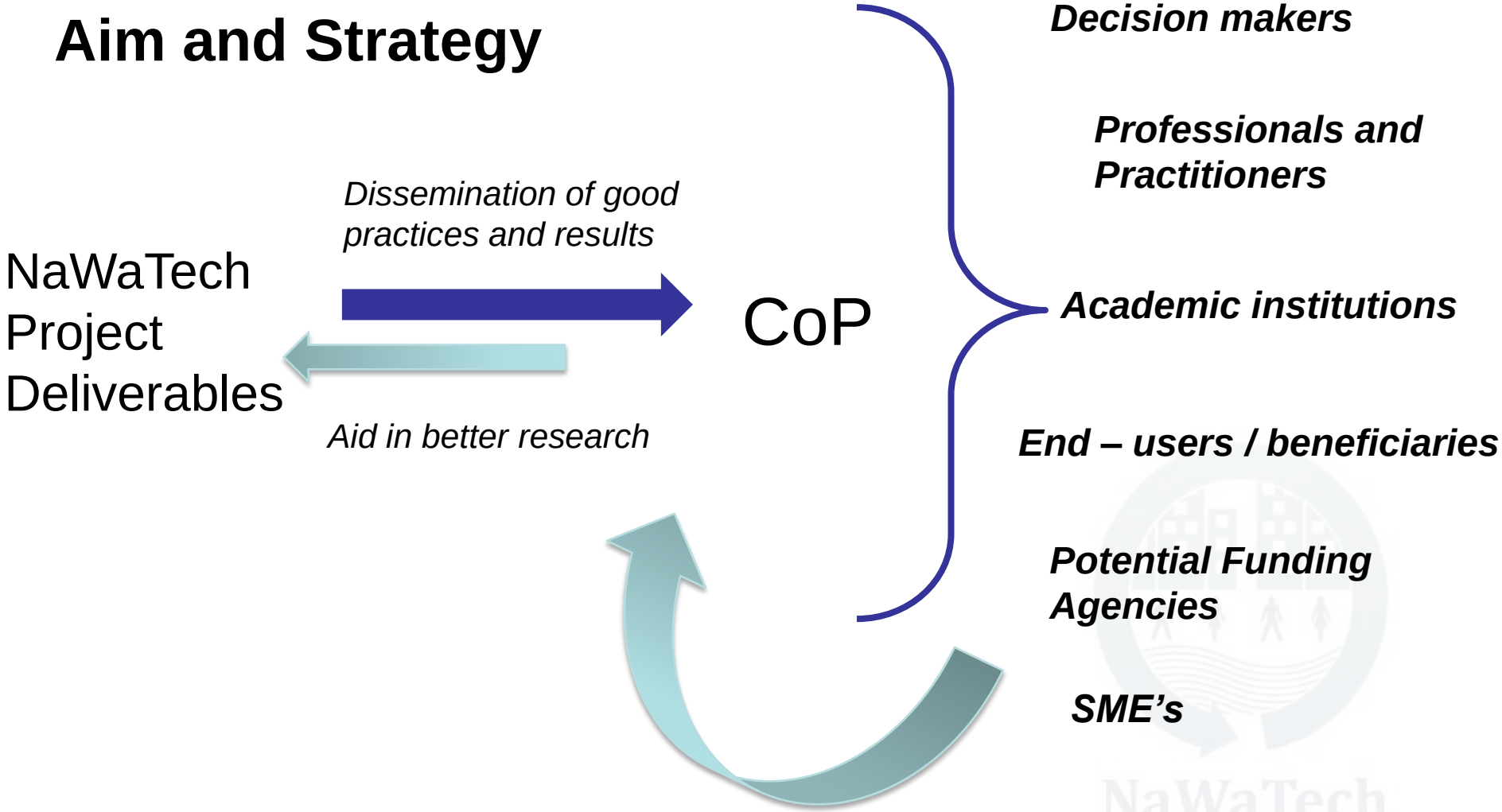




Membership in the NaWaTech CoP is voluntary

Community of Practice (COP)

Aim and Strategy



Community of Practice (COP)

Nagpur Chapter

- CoP meetings / workshops / interactions
  - Stakeholders
    - Central Railway, Ajni
    - Dayanand Park, Jaripatka, Nagpur
    - Building Association
  - Decision Makers
    - CPCB & State PCBs
    - MJP
  - Professionals / Practitioners
    - MPCB Nagpur Office
    - IWWA, Nagpur
  - Exhibitions
    - Knowledge Expo, New Delhi

Community of Practice (COP)

Pune Chapter

- **CoP meetings / workshops / interactions**
  - **Academic Institutions**
    - **150 registered students as CoP peripheral members**
    - **Collaborated with 5 colleges for long-term COP activities**
  - **Stakeholders**
    - **COEP Pune**
    - **Amanora Park Town**
    - **Building Association**
  - **Exhibitions**
    - **Lions Environment Expo**
    - **Sanitation Technology Exhibition**
    - **Rotary Service Expo**
  - **Professionals / Practitioners**
    - **SME Breading**

Community of Practice (COP)

Outreach

- Facebook
- Poster (Bi Lingual)
- Leaflet (Bi Lingual)
- Media Coverage
- Pamphlets

Community of Practice (COP)

Future activities

- Engaging the collaborative institutes and organizations to carry forward the CoP activities for long term
- Involving college students/professionals in various CoP initiatives creating internship/research opportunities for them
- Continuing the CoP activities through NaWaTech Web Forums, Social Sites by engaging peripheral members
- Organizing the site visits for interested institutes or organizations (Government or Privates) for knowledge sharing

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NaWaTech

Panel discussion

with implementation partners

- **Mr. Mangesh Dighe (Pune Municipal Cooperation)**
- **Prof. B.G. Birajdar (COEP)**
- **Mr. J.K. Bhosale (Amanora Park Town)**

Moderated by

- **Pawan K. Labhasetwar**
- **Mirko Haenel**

NaWaTech

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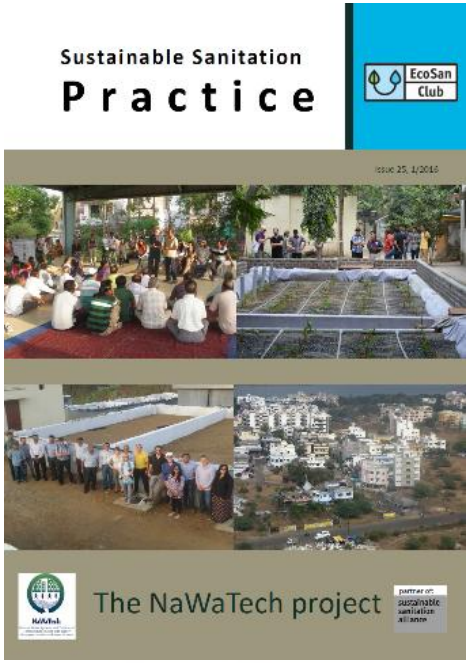
NaWaTech

Summary + post-project activities

What has been achieved?

- **Scientific publications:**
  - **Journal papers:** 3 published / 1 accepted / 1 submitted
  - **Special Issue of *Sustainable Sanitation Practice* journal**
    - with 14 papers on all aspects of the NaWaTech project
    - Open access, on-line at http://www.ecosan.at/ssp
  - **Full papers in conference proceedings: 5**
  - **Conference presentations: 13 Oral + 4 Poster**
- **NaWaKit - all results published at SSWM Toolbox**
- **Release of NaWaTech video**



Summary + post-project activities

What has been achieved?

- **Open access publications**
  - Video
  - NaWaKit knowledge platform
  - Compendium of Technologies
  - 2 recommendation papers
  - Special Issue of *Sustainable Sanitation Practice* journal
  - Publication of Case studies in the SuSanA platform

Summary + post-project activities

What has been achieved?

- **7 Project meetings** (2 EU / 5 IN)
- **5 International workshops /conferences** (2 EU / 3 IN)
- **2 Trainings** (- EU / 2 IN) - 55 entrepreneurs trained
- **MSc theses: 11 completed** (7 EU /3 IN) **/ 3 on-going** (- EU /3 IN)
- **PhD theses: 1 completed** (1 EU /- IN) **/ 3 on-going** (1 EU /2 IN)
- **Student exchange:** Involved students:

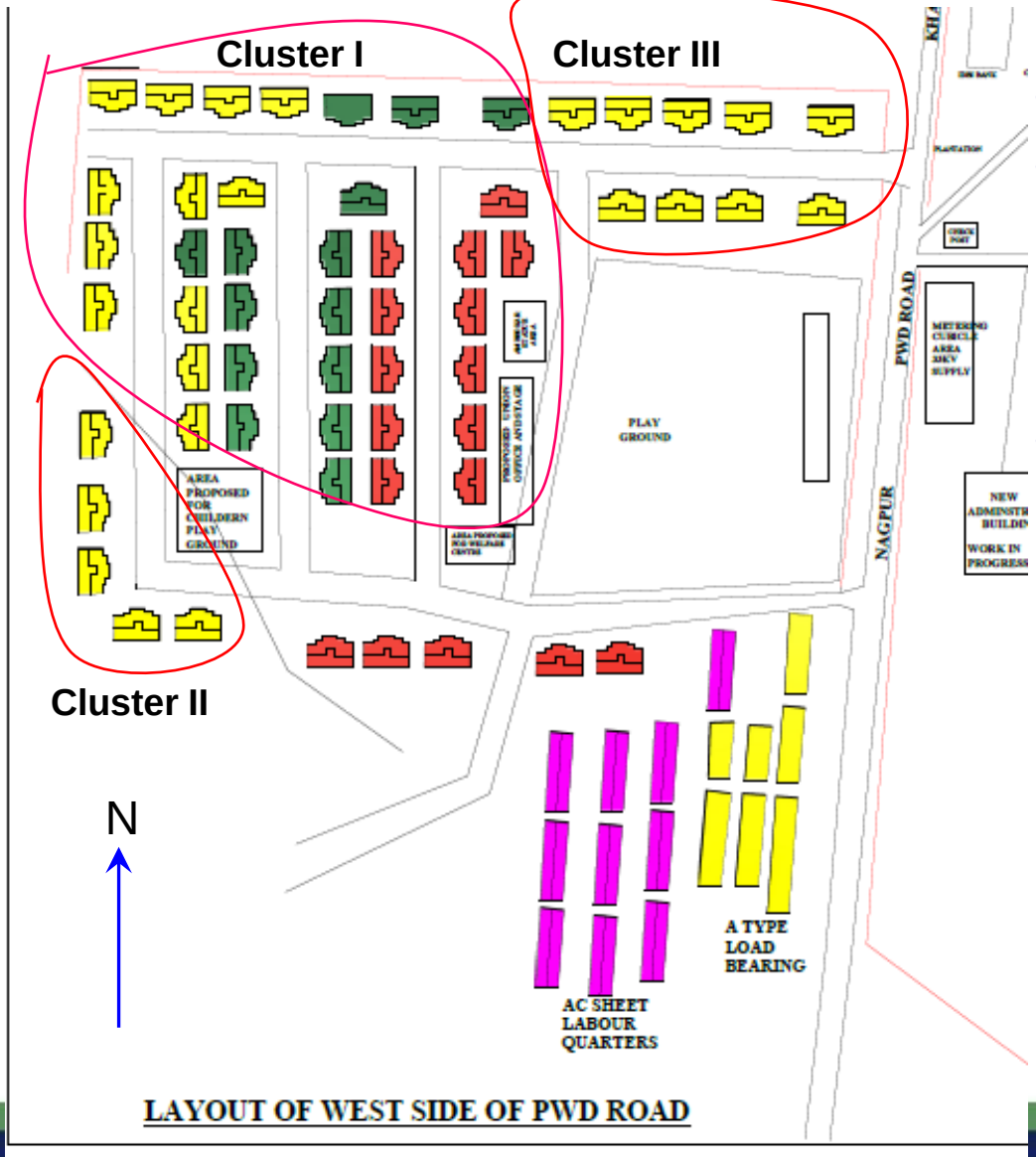
  - 9 students from EU to IN (1 PhD / 8 MSc) - 91 weeks / 640 days

  - 5 students from IN to EU (2 PhD / 3 MSc) - 51 weeks / 360 days

Summary + post-project activities

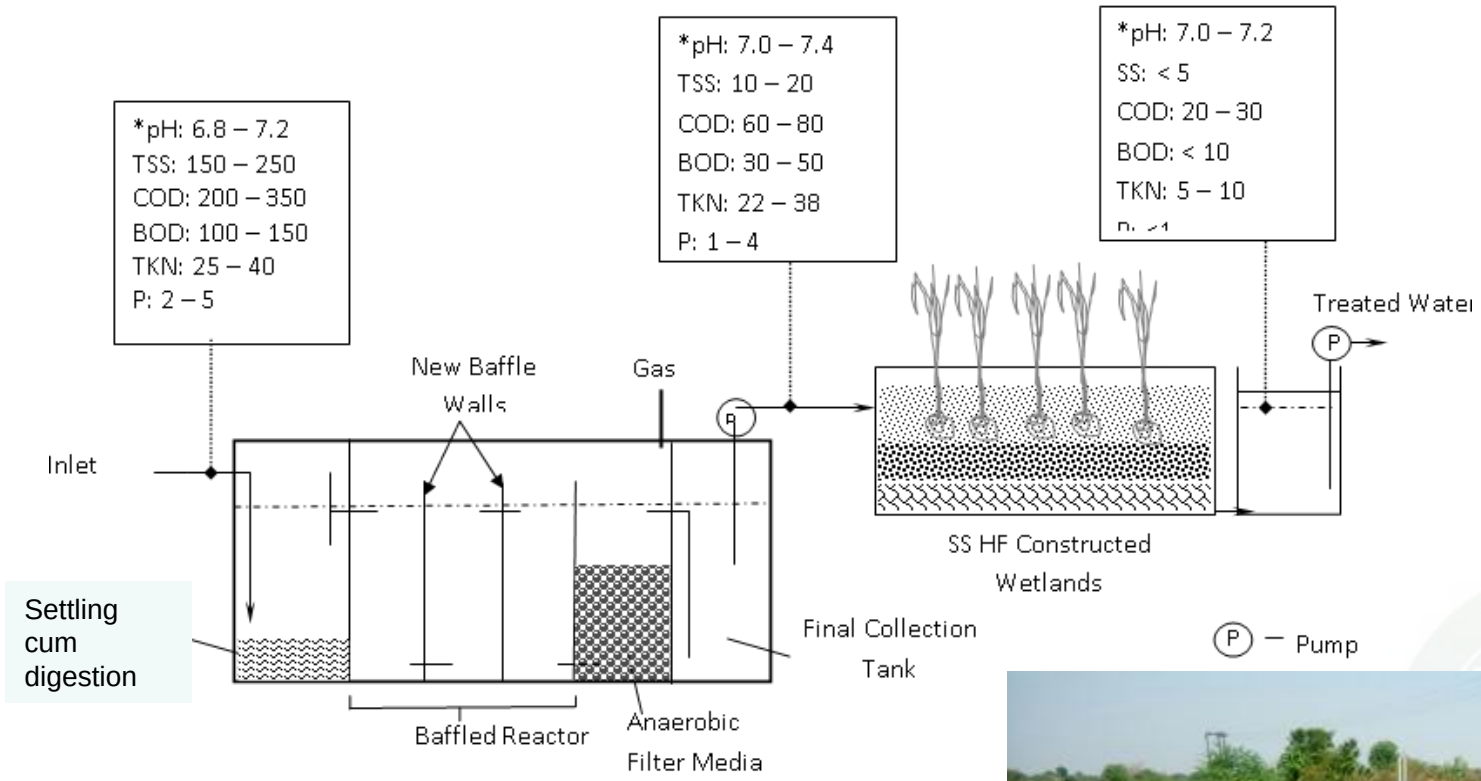
- Replication of NaWaTech systems
  - E.g. OFAJ treatment scheme replications in Nagpur
    - MOIL Housing Complex, Gumgaon (200 m^3/day)
    - Housing complex in Hingnghat (150 m^3/day)
    - Villages Patansawangi and Navegaon Sadhu through Zilla Parishad (200 and 50 m^3/day, respectively)
- Convert NaWaTech COPs into IWWA Directorate
- Transferring NaWaTech design specifications into agencies for implementation of decentralised systems (MJP)
- Design specifications to central agencies (CPHEEO)

Example: Replication of OFAJ treatment scheme for MOIL Housing Complex, Gumgaon



- Total Number of houses: 240
- Divided in three clusters:
  - Cluster I: 150 m^3/d
  - Cluster II: 30 m^3/d
  - Cluster III: 20 m^3/d
- Treatment system:
  - Oil & grease traps followed by Combination of Anaerobic System and HF wetlands
  - Material of construction: brick work, PCC, RCC & HDPE for impervious lining

Example: Replication of OFAJ treatment scheme for MOIL Housing Complex, Gumgaon



Many thanks for your attention

Questions?

NaWaTech Consortium