

Sustainable, Cost Effective,
Innovative Building
Technologies and Systems

Building homes for life



Food, Fabric and Shelter ...

These 3 words characterize the very fundamental "Essence" of Living. Knowledge provides the light to attain these fundamental needs. "Tantra" - the scripture by which the light of Knowledge is spread is derived from "Tattva" - the science of Cosmic principles and "Mantra" - the science of Mystic sounds and vibrations.

While the Knowledge of Food and Fabric got widely spread and remained accessible by masses over ages, the knowledge of Shelter got increasingly confined to a select few as we progressed into the modern world. The traditional knowledge and techniques on "Nivara"

got buried with time, making it unattainable for today's laymen to even think of building on their own, a robust, sustainable and habitable Shelter.

"NivaraTantra" is a novel initiative, unraveling the Excellence, Strength, Elegance and Simplicity of building structure derived and integrated with nature and mother Earth.

NivaraTantra offers to empower a common man to accomplish his aspiration of building a dwelling / structure on his own which is comparable to the best in class Modern structure and yet sustainable and affordable.



Prashak at a Glance...

Prashak Techno Enterprises Pvt. Ltd. is a unique organization based on the strong foundation of research and development of cutting edge building technologies, more particularly the novel Habitech technology researched and developed by the Asian Institute of Technology (AIT), Thailand, which enables the creation of a wide range of innovative building components and construction structures that are environmentally friendly, disaster resilient, robust, scalable, adaptable, energy efficient and highly affordable. NivaraTrantra enables significant reduction in cost and pollution while building the clean, green and safe

dwelling/structures resulting in extraordinarily positive impact on social and environmental aspects.

Steered by its Inventrepreneur - Dr. Praful Naik who has over 100 patent filings, Prashak's vision is to empower every global citizen to fulfill the desire of building and owning a respectful dwelling as well as partner with Communities to contribute socially and environmentally by creating green, safe, sustainable and affordable structures.



Habitech-NivaraTantra Technology

Habitech- NivaraTantra redefines edifice and housing structure scenario - a unique confluence of technology and material from "Mother Nature" leading to novel, ecological and affordable construction / dwelling structures for all.

This novel invention comprises intermeshing blocks made from local soil along with a composite of binding agents and additives integrated with intermittent reinforcement. The production of intermeshing blocks is an entirely green process and unlike the conventional brick making process, it does not require kilns / furnace to fire the

blocks. This synergistic combination of the intermeshable blocks and reinforcements obviates use of beams, columns and concrete lintels.

The use of local soil for onsite manufacture of blocks along with onsite quality check makes it undoubtedly one of the most sought after solutions that caters to the unmet need of the market – an onsite, sustainable, cost-effective, green solution for construction structures including housing, empowering masses to build their own house in a very simplistic and most cost affordable way.



The blocks can be tailored for required and/or applicable end use. The production processes are fully adaptable for skilling of local people unskilled in the art of making construction structures. It also results in substantially lower embodied energy obviating need of kilns for heating, reducing use of mortar, enabling use of locally available material to build a robust, safe, environmentally friendly as well as resilient and cost effective construction structure.

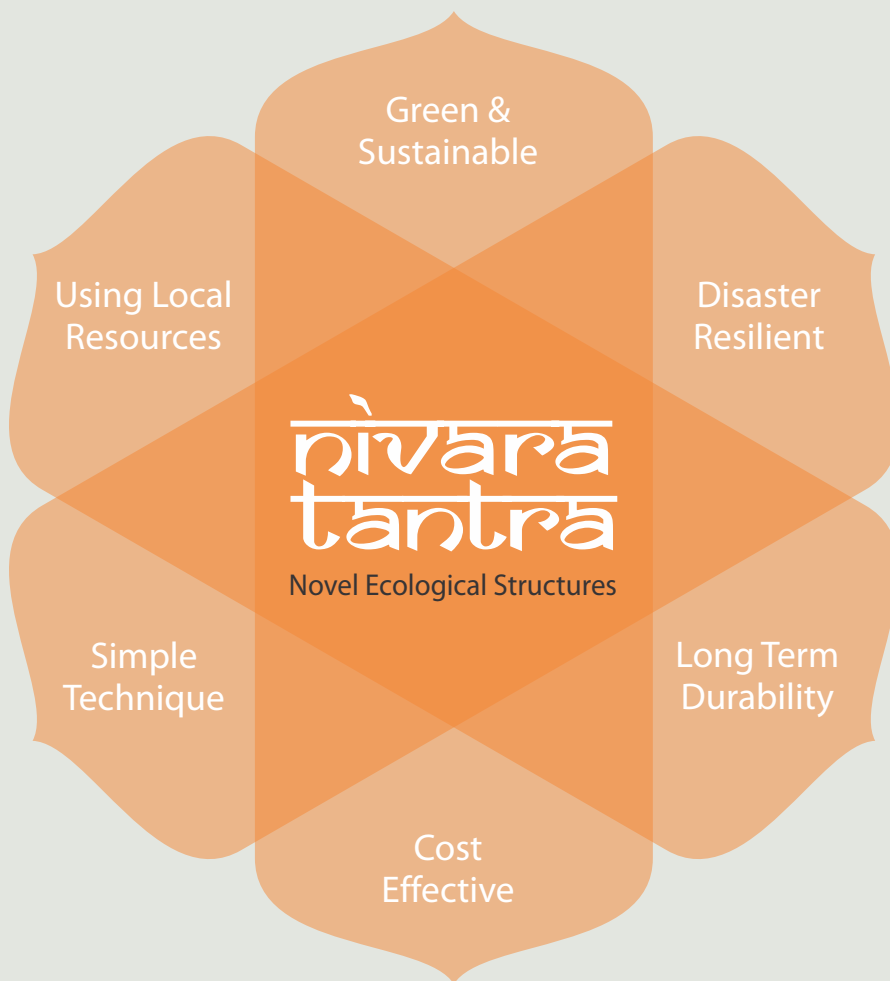
These clean, green, environmental friendly, disaster resilient, sustainable structures can be customized as per the

end use requirement.

"Habitech- NivaraTantra" - the integrated Innovative Building Technology solution that blends nature with architectural and structural science, resulting in creation of simple yet novel structures which embodies multiple value outcomes including breaking the shackles of dependency on construction skills and financial ability as well as empowering lay people to bring to reality, the creation of respectful, robust, habitable social housing community.



Key Attributes of Habitech-NivaraTantra Solution



Building Cleaner, Greener, Energy efficient,
Sustainable and Affordable Housing
Structures and Communities

Green and Sustainable

- Onsite process for manufacture of novel intermeshing blocks and other building components
- Novel intermeshing blocks:
 - Uses local soil as a major ingredient
 - Do not require heat energy and fuel combustion for manufacture
 - Are designed to result in substantial reduction / elimination of wastage
- Substantially lower carbon footprint due to lower transportation requirement
- Passive architecture



Disaster Resilient



- Is Earthquake safe due to use of horizontal and vertical reinforcement in required areas
- Minimum damage in case of flooding
- High resistance to wind, hurricanes
- Resistant to Fire



Long Term Durability

- Weather resistant/Suitable for all climatic conditions
- Water resistant
- High compressive strength
- No maintenance
- Cement base, long service life



Cost Effective



- Substantial reduction in transportation cost due to on-site manufacture of building blocks and other components using locally available soil
- Predominant use of unskilled local labour
- Lower labour requirement in comparison to Conventional methods
- Lesser use of cement and sand in comparison to conventional methods
- Intermeshing blocks look aesthetically elegant on their own obviating need of plastering
- Highly uniform surface of blocks substantially reduces thickness of plastering, if required
- No wastage arising out of cutting / chipping of blocks as done in conventional bricks
- Load bearing walls eliminate the need of beams and columns



Simple Technique

- Substantially faster and quicker construction
- Uses cutting edge yet simple to use manual / hydraulic press equipment for making the intermeshing blocks
- Modular construction / building components enables effortless handling and construction
- Design of intermeshing blocks enables:
 - Unskilled worker to construct with ease
 - Self alignment due to inherent intermeshing characteristics
 - Effective use and incorporation of reinforcement components
- Adaptable and Scalable technique, just appropriate for local conditions and available skills



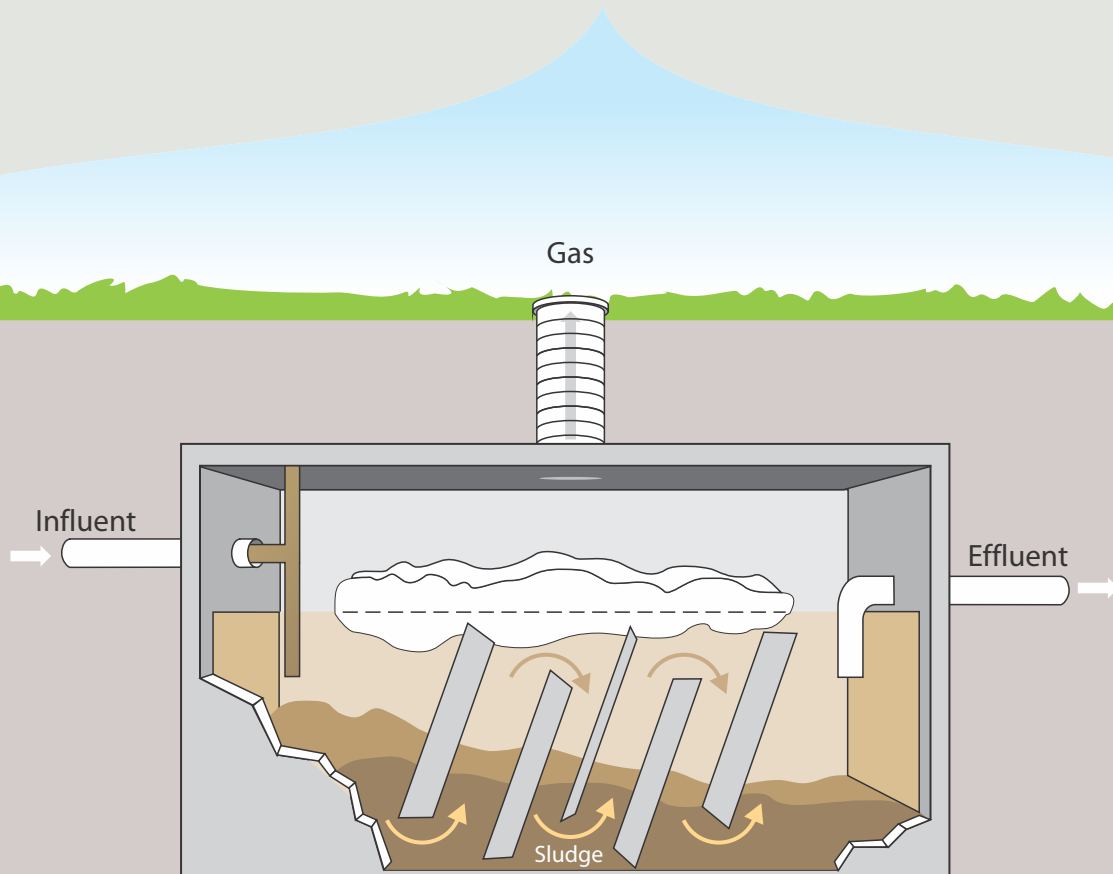
NivaraTantra Sanitation Solution

An effective sanitation system is the core of a healthy community. Deployment and use of good sanitation solution by a Community plays an important role in enabling the Health and well being of its residents.

Habitech-NivaraTantra synergistically integrates an innovative on-site sanitation solution to treat wastewater from the toilet. This on-site solution includes an anaerobic septic system provided with multiple chambers configured in series. The system is manufactured on site using compacted

intermeshing blocks made from the local soil and with local available manpower.

Each of the chamber in the System is provided with a partial partition to enable flow of effluent beneath it. The bacteria within the system tend to move in vertical direction with gas production but due to the partitions and chamber configuration the horizontal movement of the bacteria is relatively slow. This novel configuration enables effluent to come in contact with a large active biological mass as it passes through the septic system resulting in



substantial reduction of solid and organic contents from effluent. This unique configuration also obviates the need of any mechanical mixing or moving parts.

The novel and innovative effluent distribution system and septic system proportions, results in substantially lower hydraulic retention time, stability to hydraulic or organic shock loads and enables retention of biomass without the use of fixed media or additional solid-settling chamber.

This novel and innovative multi chamber anaerobic septic system is robust, green, modular, scalable, cost effective and appropriate to be well incorporated in the social housing. The treated effluent will be further polished by a constructed wetland unit planted with decorative plants which can enhance aesthetic value in a housing compound / complex. The final treated effluent can be then disposed safely into the environment.



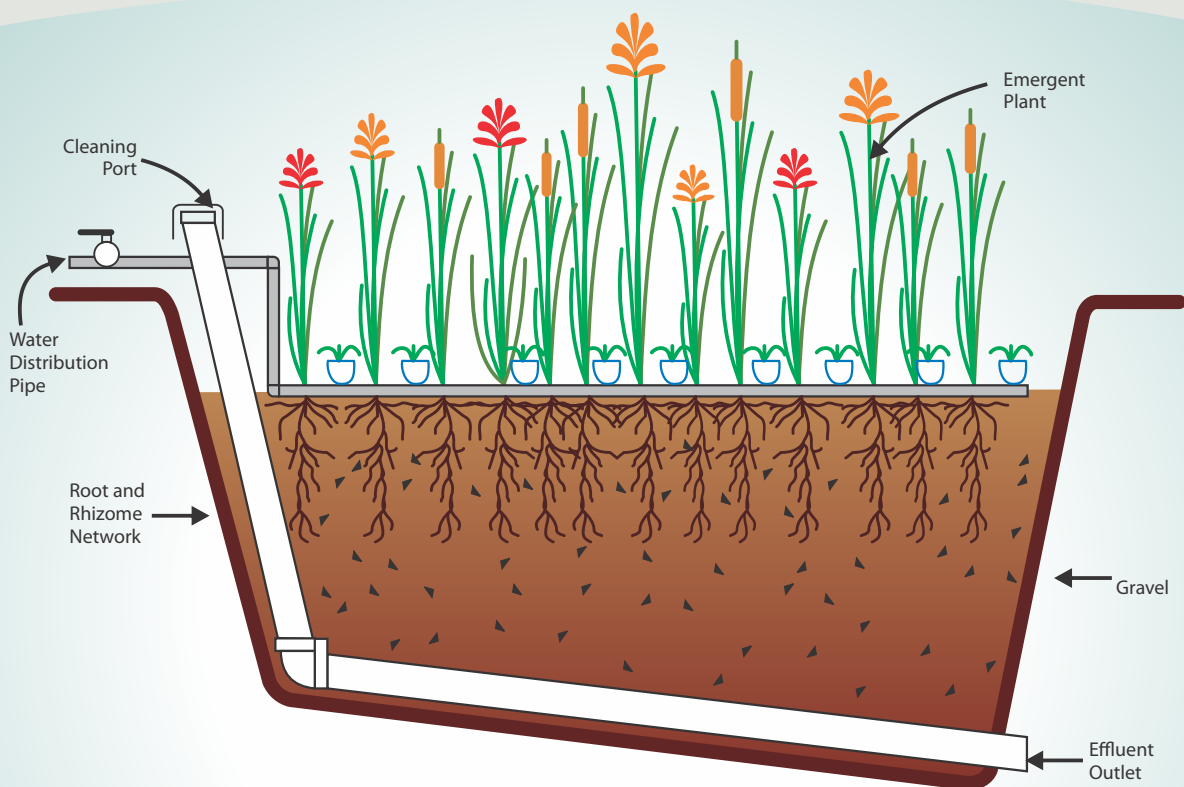
Constructed Wetland

Discharging untreated faecal sludge (FS), the material accumulating in onsite sanitation systems, into watercourses or land may cause environmental degradation and serious public health risks.

What is a wet land? As water flows through a wetland; many of the suspended solids become trapped by vegetation. Further, the pollutants are transformed to less soluble forms taken up by plants or become inactive. The appropriate conditions for

microorganism growth are fostered by the wetland plants.

Inspired from Mother Nature, a biologically diverse and natural ecosystem in the form of an integrated wetland system is developed for the treatment of wastewater. Natural wetland systems filter pollutants from water that flows through on its way to receiving lakes, streams and oceans.



A wetland is constructed at site (Constructed wetland) as a wastewater treatment system that uses a synergistic combination of natural processes involving wetland vegetation, soils, microbial life growth, to enhance water quality.

The system creates an aesthetic environment for both leisure and eco-tourism purposes, and serves as habitats for native flora and fauna.

Advantages of Constructed Wetland

Treatment Systems:

- Very low operation and maintenance costs
- Easy to maintain
- Can be designed to provide habitat enhancements and contaminant mitigation
- Substantially low cost of construction

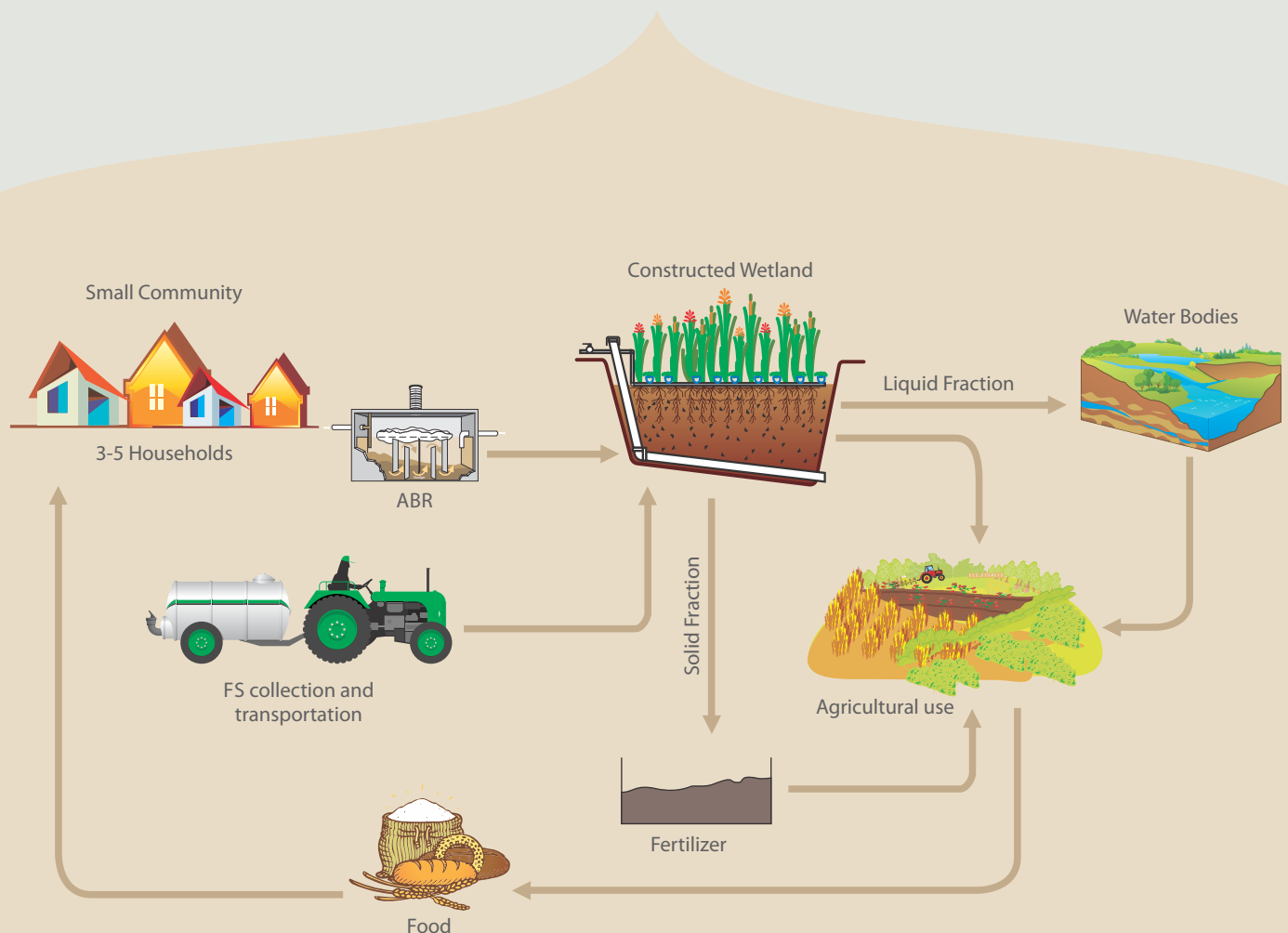


Constructed Wetland Phi Phi Island, Thailand

Closed Loop Sanitation Management

The entire “Sanitation Value Chain” of the faecal sludge management is addressed by applying “**Naturally Acceptable and Technologically Sustainable**” (NATS) solutions developed by Asian Institute of Technology, Thailand.

The integrated approach to provide sustainable and scalable technological solution includes innovative toilet design, septic tank construction, collection of faecal sludge, treating it naturally using constructed wetland and reusing the solid and liquid fraction as fertilizer and water source for agricultural use.



Local Resources

- Effective use of locally available soil
- Construction can be accomplished using local semi-skilled and/or unskilled labour
- Generates employment for local labour and enables people to earn while building their own homes



Technology tie-up with AIT

Prashak Techno Enterprises and Asian Institute of Technology (AIT) based in Thailand have signed the MOU for long term collaboration on continual development, creation of Intellectual Property and commercialization of the Innovative building technology solutions.

Habitech-NivaraTantra Technology solution has Intellectual Property Rights vide a diverse patent portfolio which is owned by Asian Institute of Technology. Prashak has usage and deployment rights in designated regions by virtue of it being responsible for active maintenance of these Intellectual Property, globally and also its CEO, Dr. Praful Naik being the coinventor.



Professor Dr. Worsak Kanok-Nukulchai, President - AIT and Dr. Praful Naik, CEO - Prashak Techno Enterprises exchanging the signed MOU

Successful Projects



Some of the noteworthy projects accomplished using the novel technology researched and developed at the Asian Institute of Technology, Thailand



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