



Decentralized Wastewater  
Treatment Solutions

# AgroClean | Wastewater Treatment for Agro-Industry



**Effective and sustainable  
wastewater treatment and  
reuse for a variety of  
agro-industries**



**BORDA**

AgroClean |  
DEWATS Service Package

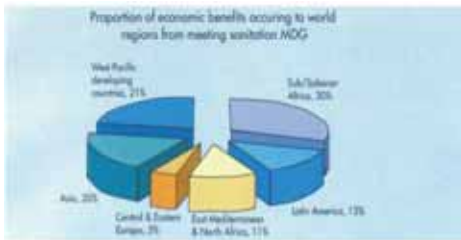
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# Agro-industry pollution is a barrier to safe and economical production

## Effects of agro-industry pollution

Developing nations often rely on a combination of subsistence farming and income generation from informal agro-industries, yet health risks and environmental pollution can have a great impact on both of them. Due to the unsafe discharge of agro-industry waste, clean water supplies are polluted, productive potential is exhausted, and health risks in the region are gravely increased.

- o A German Parliament report from 2008 recently found 70% of industrial enterprises in developing nations discharge wastewater untreated into the environment
- o Improved sanitation reduces diarrhoeal morbidity by 32%



World Region	Population (m)	Cost benefit ratio
Sub-Saharan Africa	918	1.7
Latin America	524	9.0
East Mediterranean & North Africa	572	23.2
Central & Eastern Europe	495	10.0
South-East Asia	2,162	2.8
West Pacific developing countries	1,279	3.4
All regions	7,183	5.8

## Informal Economies

Informal agro-industries often discharge wastewater untreated into the environment more than formal enterprises because of inadequate sanitation facilities.

- o According to an International Labour Organisation report (ILO, 2002) the informal economy, including peri-urban enterprises account for up to three-quarters of employment in developing countries
- o In India, the informal economy accounts for 93 percent of total employment (ILO, 2002)

## Gaps in centralized sewage

Many informal agro-industries cannot pay high investment and maintenance costs required for centralized wastewater treatment systems.

- o Central sewage projects create significant gaps in peripheral areas and do not allow for new or expanding agro-industries.
- o Afflicted workers and communities often create inadequate substitutes that discharge wastewater without meeting environmental standards.

Left: Meeting sanitation goals can greatly improve economic benefits. Below: Living conditions near a polluting slaughterhouse

## BORDA BNS Networks Mission

With a mission to improve the livelihoods of disadvantaged groups within societies and to sustain the functioning of eco-systems through dissemination of demand oriented Basic Needs Services (BNS), BORDA (Bremen Overseas Research and Development Association) and its BNS Partner Network develop and disseminate innovative solutions for facilitating the access to BNS.



Waste dumped at a factory pollutes surroundings, contaminates drinking water, and causes complaints from neighbours

## DEWATS Service Packages

One Basic Needs Service is DEWATS, an effective, efficient, affordable and proven wastewater treatment solution for (sub-) tropical regions and low-income countries. DEWATS stands for "Decentralized Wastewater Treatment Solutions", but it is much more than just a technical approach. DEWATS Service Packages include not simply the construction of hardware but a whole set of integrated measures which are combined according to demand. AgroClean is one of these DEWATS Service Packages that aims to improve wastewater treatment and reuse in agro-industries.



# Adaptable and efficient wastewater treatment and reuse for a wide range of agro-industry applications

## DEWATS AgroClean

As with other DEWATS solutions, AgroClean is designed with innovative technology that can be built by local craftsmen and engineers using locally available resources. AgroClean is an affordable solution designed for small to medium enterprises to ensure the existence and sustainability of clean water supplies, safe health conditions, and economic viability.



*Left: AgroClean is ready for large-scale industries such as this alcohol distillery in Vietnam or at a pig farm in China (above)*

## Key features of AgroClean

DEWATS AgroClean is an efficient and effective treatment solution for agro-industry wastewater that utilizes **sustainable and adaptable technology**. Its key features are:

- **Efficient design** that treats high load capacities of organic industrial and residential wastewater
- Innovative technology and adaptable construction that can **process extreme fluctuations in wastewater composition**
- Allows **on-site waste to be disposed of properly and on-time** without chemicals or energy inputs
- An open system and demand-responsive approach allows local farmers and industries to **self-manage the sanitation facilities**

- DEWATS AgroClean **fills gaps** in areas centralized sewage systems cannot reach
- Modular design of all components **creates low primary investment costs** since no imports are required
- **Reliable and long-lasting** construction design eliminates expensive and sophisticated maintenance
- **Multi-stakeholder approach** allows for adaptable design based on geographic location, load capacity and community/industry involvement
- **Wastewater meets environmental standards**
- **Wastewater can be reused** for irrigation, while ensuring sustainable supplies and continued production

## Resulting Benefits

These measures, which are coordinated by BORDA's regional offices and implemented with local BORDA BNS Partner Organizations, provide a range of benefits:

- Provides an **expandable waste treatment solution** to decentralized agro-industry enterprises
- Allows subsistence farmers and agro-industries to continue their practices **without unnecessary environmental degradation or increased health risks**
- Advances conditions for clean water supplies, **improved sanitation and the reliability of agro-industry production**

# DEWATS AgroClean - a proven solution

## Additional benefits

- o Biogas occurs naturally during the treatment process and can be used for lighting and cooking, creating an estimated 5 to 20% reduction in energy expenses
- o Compost is a natural and highly beneficial fertilizer resulting from the treatment process, which can be directly distributed to farms
- o Efficient treatment of daily wastewater flows up to 500m<sup>3</sup>/day

## Operation & maintenance training

The benefits of DEWATS AgroClean are assured through a simple but permanent operational process. That is why the DEWATS Service Package integrates special operation and maintenance training for all DEWATS AgroClean facilities. It enables community members or workers to maintain the facility independently and self-sufficiently.



## Different designs for different applications

DEWATS AgroClean is a flexible and adaptable solution ready for many different applications.

List of agro-industries already using DEWATS:

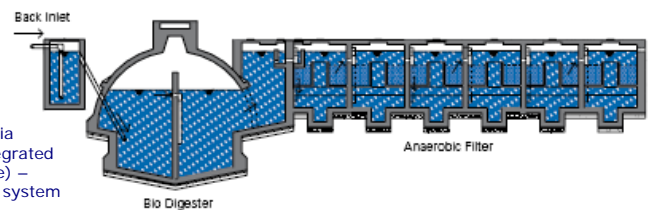
- o Vietnam - alcohol distillery factory
- o Indonesia - large and small scale tofu productions, palm oil
- o The Philippines - waste disposal for central marketplace
- o India - canned food factory, rice mill
- o China - slaughterhouse, bean curd processing, animal husbandry

## A proven solution

For over 15 years BORDA has led the way in innovative wastewater treatment facilities. Today, BORDA and its BNS Partner Network have already achieved the sustainable operation of more than 900 DEWATS solutions. This demonstrates that DEWATS AgroClean is a proven and affordable solution to combat wastewater problems in agro-industry enterprises. Total costs are based on load capacity and geography but basic units are below 10.000 €; all infrastructure will be based on locally available materials and labour.



Technical layout of a DEWATS unit in Mekarsari Jaya, Indonesia (right) – constructed, good integrated DEWATS plant on a field (above) – Anaerobic unit of the DEWATS system under construction (left)



## DEWATS Service Packages

- o Treatment Systems
- o Community Based Sanitation
- o School Based Sanitation
- o Sanitation for Hospitals & Hotels
- o Wastewater Treatment for Agro-Industry
- o Emergency Sanitation
- o Sanitation for Prisons
- o Sanitation for Real Estates
- o Sanitation Mapping
- o Municipal Sludge Treatment Plant
- o Health Impact Assessment & Hygiene Education
- o Capacity Development
- o Standardisation
- o Research & Development

## DEWATS – Decentralized Wastewater Treatment Solutions

Developed & disseminated by BORDA and over 20 BORDA BNS Network Partners in South and South East Asia & Southern Africa

With support from:



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