



BGR-Symposium “Coupling Sustainable Sanitation and Groundwater Protection”

Sustainable and safe application of
sludge and wastewater in Short-Rotation-
Plantation

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Contact: Mirko Hänel – Research Director (mhaenel@ttz-bremerhaven.de)



Situation in developing countries

- Lack of energy sources (mainly electricity, fuel and firewood)
- Huge amount of untreated wastewater available
- Extreme poverty of suburban and rural population and lack of income sources
- High health risks (polluted surface waters, contaminated ground water)
- Deforestation (firewood) and resulting floods and losses of fertile soils

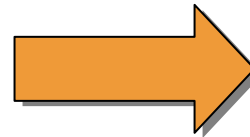


Targeted Needs

- Low-cost and efficient wastewater treatment systems with additional positive aspects (e.g. biomass production)
- New sources of income and jobs e.g. as energy farmer (especially in rural areas)
- Production of local renewable energy sources
- Substitution of chemical fertilizers with organic matters
- Clear legislation and standards for a environmental protection (health risks)



SHORT-ROTATION-PLANTATIONS



From Waste to Energy



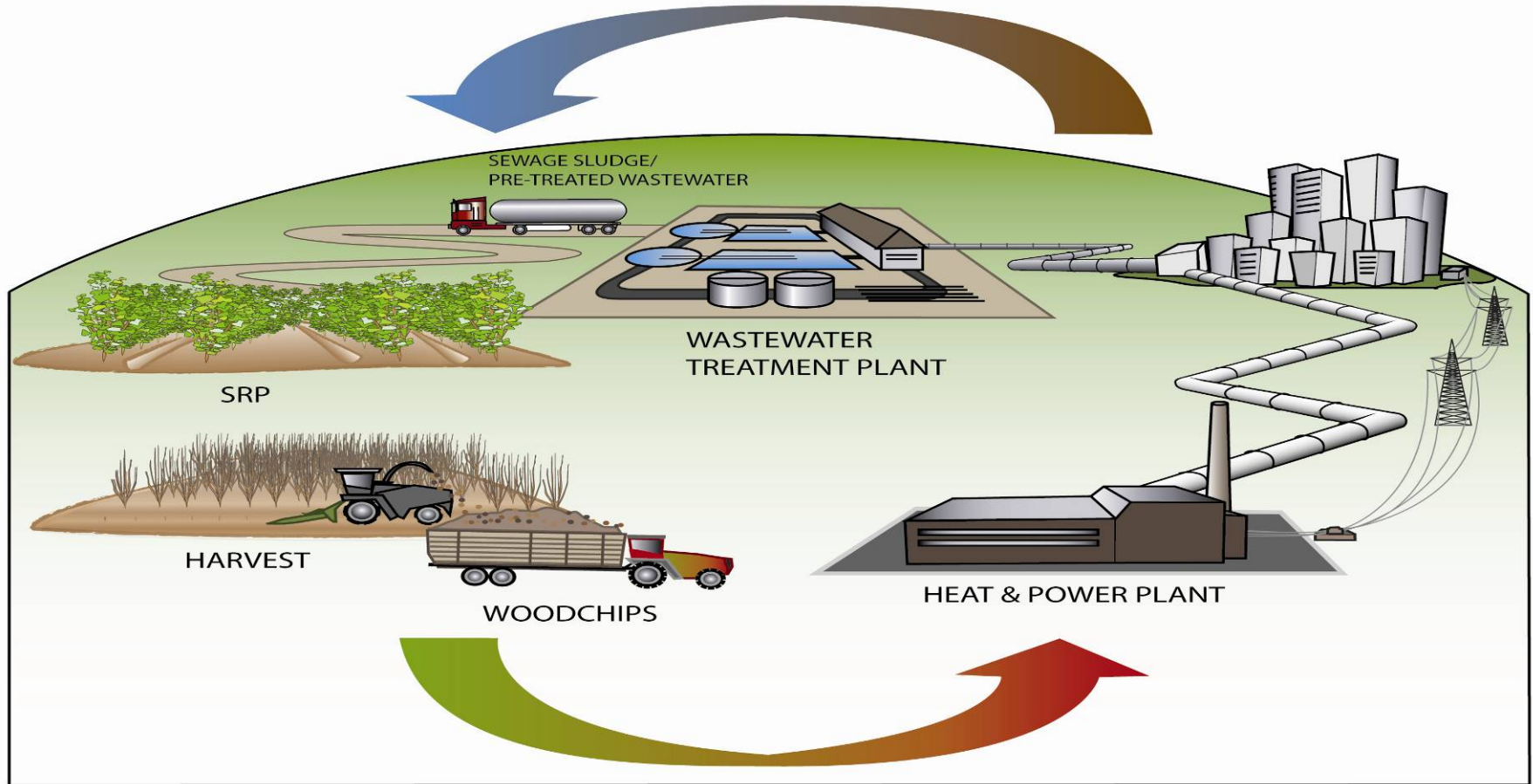
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Main principles

1. Use of fast growing and local available tree species (e.g. willows & poplars) with high potential
2. High density of plants and harvesting cycle of 2-3 years (up to 7 rotation cycles)
3. Reusing wastewater and sewage sludge for irrigation and fertilisation of trees
4. Treatment of wastewater in the root zone and direct reuse of nutrients by the plants (biofilter)
5. Enables an efficiency increase in Short-Rotation-Plantation (SRP) biomass production up to 3 times
6. Production of CO₂-neutral wooden biomass in SRPs as a renewable raw material for different technical purposes (fire wood, paper industry)

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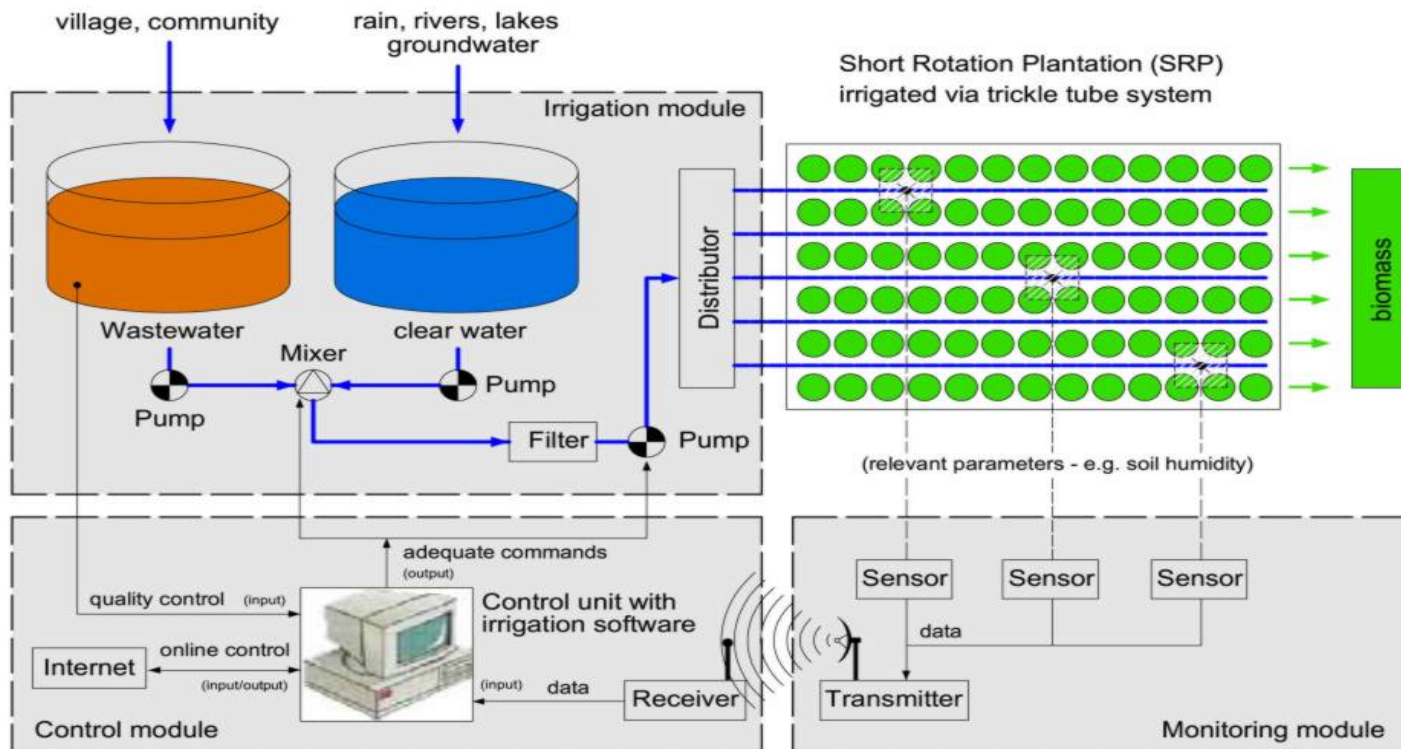
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SHORT-ROTATION-PLANTATIONS

WACOSYS: Monitoring Control System for Wastewater irrigated Energy Plantations



Applications



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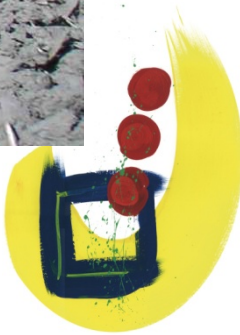
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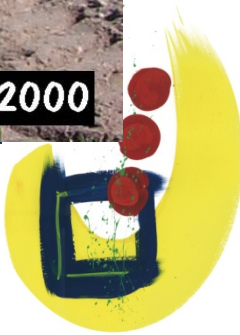
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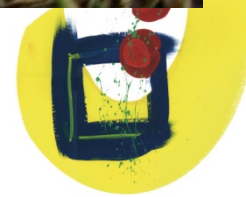
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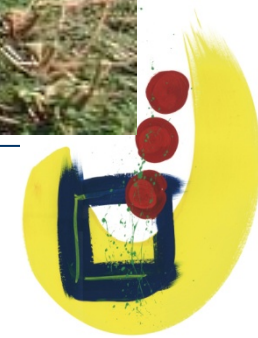
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Benefits for farmers

1. New source of income opportunity (energy farmer)
2. New source of income from wastewater/sludge recycling
3. Alternative fertilization and irrigation method at low cost
4. Flexible use with urine, wastewater, effluents (anaerobic treatment)
5. Increased income from improved biomass yields due to irrigation and fertilization
6. Increase in soil organic matter content and soil fertility



Benefits for local communities & society

1. Opportunities to reduce costs for conventional wastewater treatment (investment, operation, disposal)
2. Opportunities to produce renewable biomass for local heat and power generation
3. Supporting local economy by establishing local biomass supply chains
4. Recycling of local water and nutrient sources
5. Supporting sustainable rural development by reducing dependency upon fossil fuels

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Example: INAWAB

Supported by the European Commission (ASIA PRO ECO Program)

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ASIA PRO ECO



EUROPEAID
CO-OPERATION OFFICE

Integrated Approach for sustainable water management in Bangladesh



Goal: Performance of a feasibility study for wastewater treatment in SPRs for water recovery and firewood production in Bangladesh

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**Thank you for
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