

Rice Biomass for Agriculture & Industry in the Philippines & ASEAN

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RICE BIOMASS

Rice straw: 100 % of crop weight
Rice husk (hull): 22% of paddy weight
Rice bran: 8 % of paddy weight

Conventional Uses of Rice Biomass in the ASEAN

gardening
paddy drying
brick kiln
lime heating
cooking
animal feeds
preserving ice blocks
...others

Problems & Issues (1)

Rice straw burning in irrigated areas: Philippines



Problems & Issues (2)

Rice husk (hull) burning and dumping



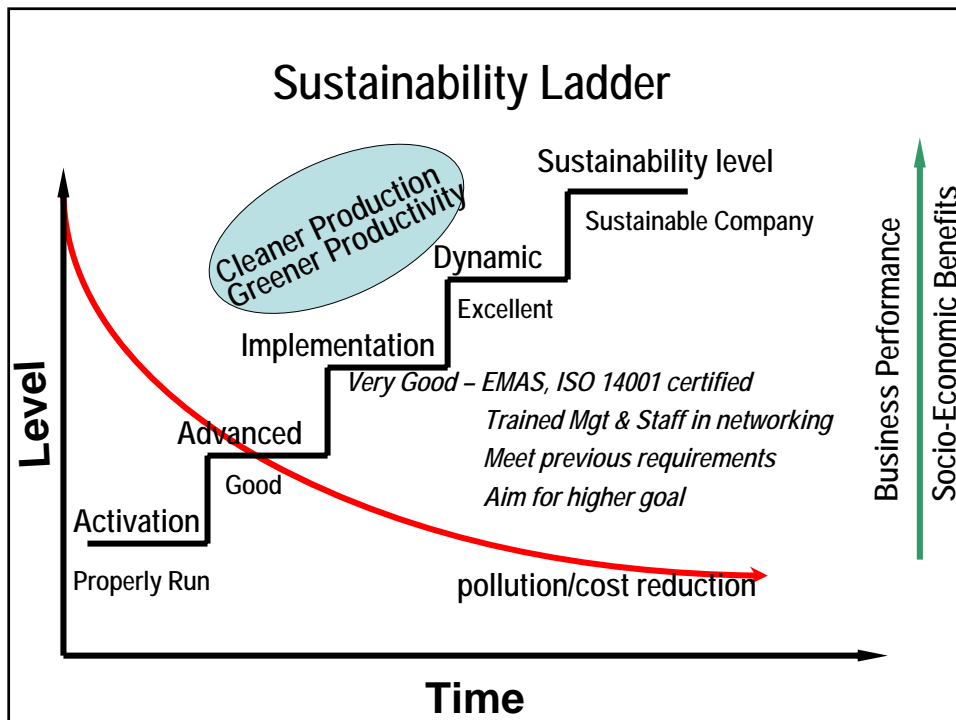
Problems & Issues (3)

Air & Water Pollution: Vietnam Mekong Delta

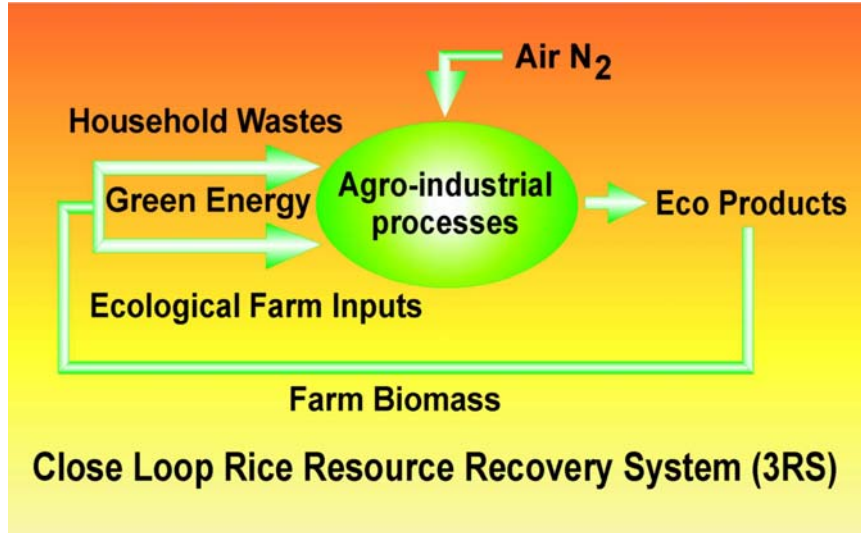


Challenges & Opportunities

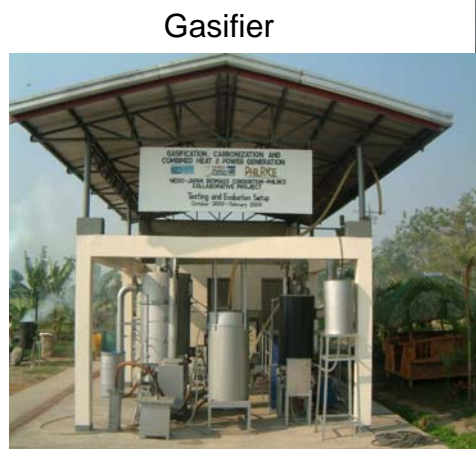
- Present demand cannot consume all rice husk supply
- Burning and/or dumping pollute land, air and water
- Health & safety issues
- Global warming and environmental degradation
- Exploring other meaningful uses
- Sustainability of technologies and practices
- Dwindling fossil fuel reserve
- Increasing cost of energy

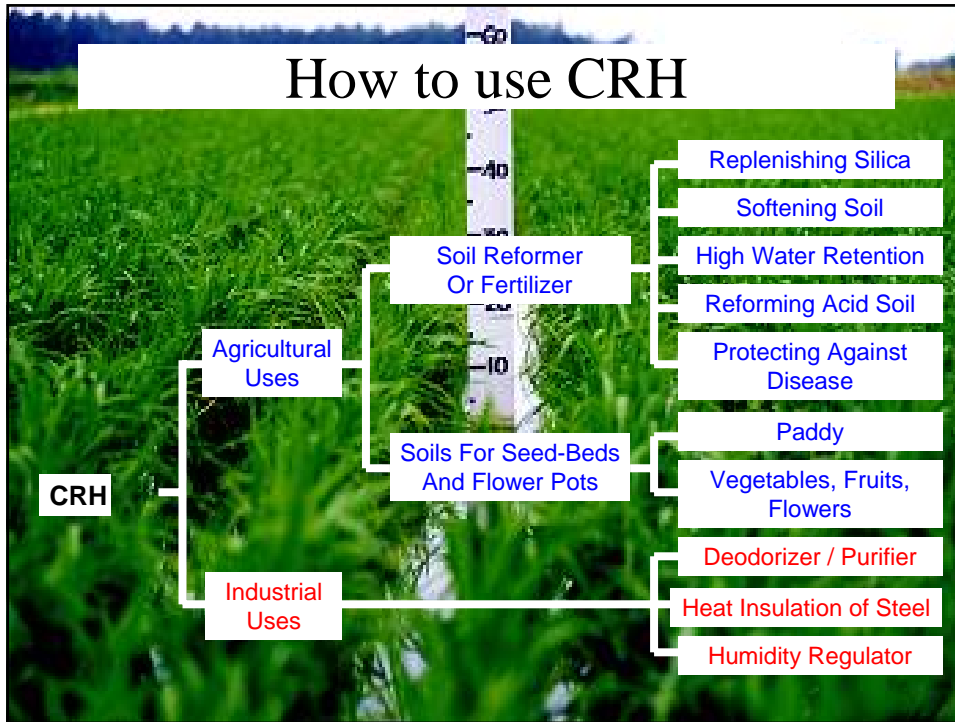


Biomass in Agriculture



CARBONIZED RICE HUSK (CRH) GENERATION



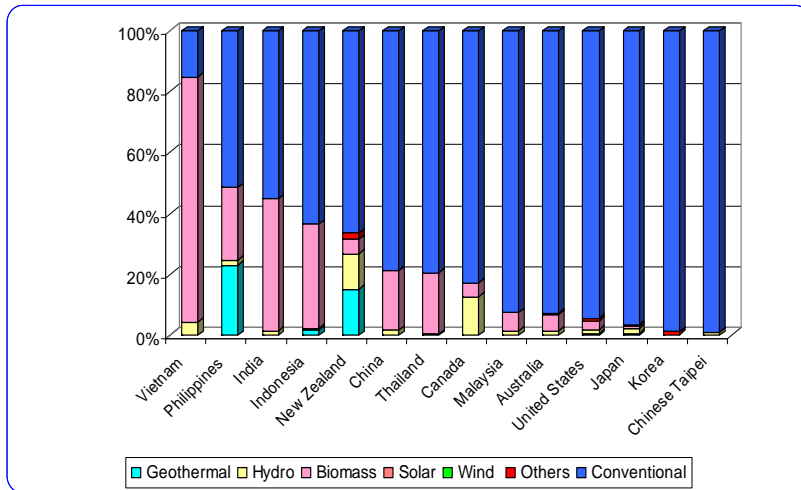


Diversified Farming Systems

Palayamanan: **WOMB** System

Waste Mgt

- Organic Farming
- Microbial Techno
- Biomass Utilization



Primary Energy Mix of Selected Countries, 1999
Share of Renewables vs. Conventional

Thailand Cogen (CHP) Plant

CHIA MENG MENG Co. Ltd

Rice Husk Fired Power Plant

Specs: **Steam Production:** 22.5 TPH
Steam capacity: 2.5 MWe
Working Pressure: 23 Bar
Efficiency: 80 %



Malaysia Rice Husk Cogen Plant



BAN HENG BEE RICE MILL

Rice Husk Fired Power Plant

Specs:

Fuel Consumption: 2 tph
Steam Production: 6.5 tph
Steam capacity: 5 MW (500kWe)
Working Pressure: 29 Bar
Efficiency: 80 %

RICE BRAN in the Food Industry

Rice Bran: 5 - 8 % by weight (10% max), most valuable by-product

18 - 23% bran oil

Oil in the germ + lipase enzyme = hydrolysis of the oil

= glycerol + free-fatty acid

= RANCIDITY within 24 hr

Remedy:

Stabilization of rice bran = sterilization, heat & pressure

= hermetic storage

= 3 – 6 months

STABILIZED RICE BRAN

Application: fat-free icing and baked goods
pasta products
dough conditioners
beverages, sports drinks
gluten-free foods
medical foods
Rice bran bar soap – cosmetics

Silica Ash in the Industry

Filler material in rubber products industries
Paints
Cosmetics industries
Sodium silicate as raw material for
- soaps, detergents, adhesives industries
Silicon Carbide (SiC)

Amorphous Silica

Highly pozzolanic material
partial replacement of cement in
improving the durability of
concrete
Anti-blocking aid for plastic films

Silica Gel

Adsorbent for oil
- Internal Surface, 500,000 m²/kg

Ethylene Adsorbent (RHA with KMnO₄)
- prolong shelf life of fruits, vegetables, flowers

Long-storage of dry seeds

ACKNOWLEDGEMENT

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PhilRice ESSO & REM



ECO-REMATES



KANSAI Corp

PEIFETS Corp ISSI (BRAIN) Corp Japan Biomass Consortium



FULL ADVANTAGE Co. Ltd (Thai/Phil)



EUROPEAN
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PROJECT

ACE EAEF 105-2004 Project

ARTSDIGITAL