



# Asian Institute of Technology Bangkok, Thailand



## Some Scientific and Social Implications behind the System of Rice Intensification (SRI)

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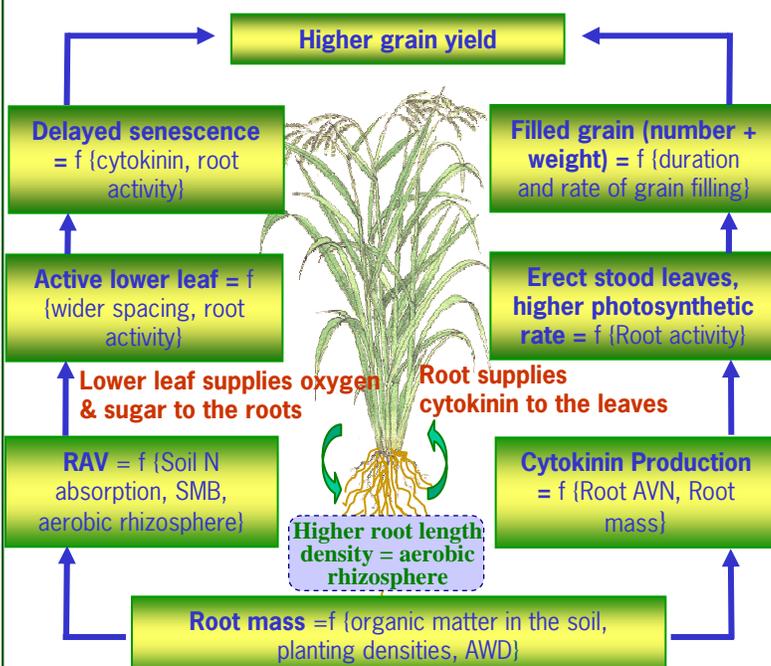
### What is SRI?

- Transplanting seedling at 2-3 leaf stage
- Transplanting 1-2 seedling(s)/hill with wider spacing
- Following intermittent irrigation at vegetative stage and shallow water level at reproductive stage
- Applying compost as much as possible.

### SRI - Exploring Rice roots for higher grain yield

- Photosynthesis in rice does not decline so much in afternoon when root activity is high - Jiang et al. (1985).
- Higher root activity during late reproductive stage delayed senescence and enhance grain filling and root activity and it was more in single seedling/hill compared to three seedlings/hill – San-oh et al. (2006).
- Higher root activity leads to more aerobic rhizosphere. Sufficient  $\text{NH}_4^+$  may be nitrified to  $\text{NO}_3^-$  in the rhizosphere to allow half the plant's N to be absorbed as  $\text{NO}_3^-$  for better biomass production. – Kirk (2003).

### Does SRI Support Higher Root Activity?



RAV – Root Available Nitrogen; SMB – Soil Microbial Biomass; AWD – Alternate wet and Dry; f – Function.

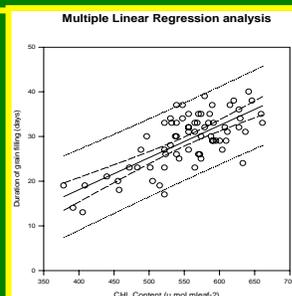
### Ongoing Experiments

To explore causal relationship between rice's root-shoot growth and their subsequent effect on grain yield under different water regimes and soil types



### Some Results

- Root length density has positive correlation with available nitrogen in the rhizosphere
- Duration of grain filling is significantly and positively correlated with chlorophyll content of lower leaves.



### SRI - Engaging Farmers in action research to generate location-specific technology

About half of global usable land is already in intensive agriculture. It adds globally significant and environmentally detrimental amounts of nitrogen and phosphorus to terrestrial ecosystems, at rates that may triple if current practices are used to achieve doubling of food production. Alternative approach that enhance scientifically sound decision making at the field level are required for sustainable agriculture. SRI provides opportunity to engage farmers in research to generate knowledge-intensive and location-specific technology for sustainable agriculture. A trial is underway in Prey Veng Province of Cambodia.



#### References cited:

- Jiang, C. Z., Hirasawa, T., and Ishihara, K. (1985) Eco-physiological characteristics of two rice cultivars, photosynthetic rate, water conductive resistance and interrelationship between above and underground parts. *Japan. Jour. Crop. Sci* 57, 132-138.
- San-oh, Y., Sugiyama, T., Yoshita, D., Ookawa, T., and Hirasawa, T. (2006) The effect of planting pattern on the rate of photosynthesis and related processes during ripening in rice plants. *Field Crops Research* 96(1), 113-124
- Kirk, J. D. Guy (2003). Rice root properties for internal aeration and efficient nutrient acquisition in submerged soil. *New Phytologist* 159, 185-194.

#### Acknowledgement:

The work reported in this paper is generously supported by Asian Institute of Technology Bangkok Thailand and Asia Rice foundation USA. The farmer's action research part is supported by FAO Regional Vegetable IPM Programme, Phase II in collaboration with National IPM Programme of Royal Government of Cambodia. Intellectual support from Prof. V. M. Salokhe, Mr. Jan Willem Ketelaar, Dr. Max Whitten, Dr. Norman Uphoff and Dr. Willem Stoop, is kindly acknowledged.

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