System of Rice Intensification

Higher yields and lower methane

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Adapting and Mitigating Climate Change

System of Rice Intensification (SRI)

Cuba – Two rice plants the same age and same variety

Building resilience through better soil management. The SRI plant on the right has more tillers and stronger roots and consequently has higher yields and is more resilient to storms, floods and droughts

By: Dr. Norman Uphoff, Cornell University

System of Rice Intensification (SRI)

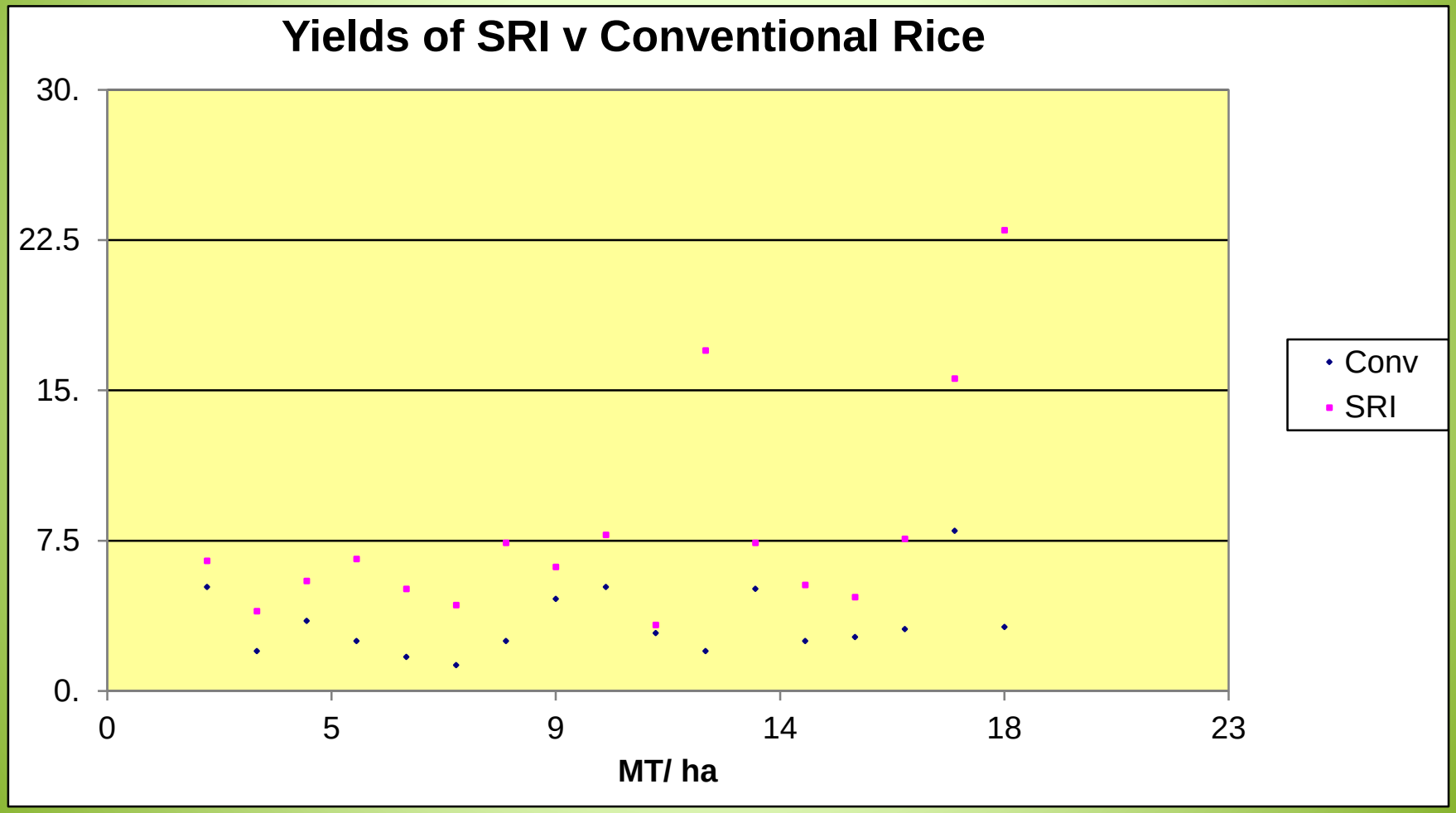
- SRI is now being used effectively in 40 countries
- Most farmers report significant improvements in yield
- Uses significantly less water
- Produces significantly less methane
- Yields of over 7 tonnes per hectare are common
- Reduces/eliminates chemical fertilizers and pesticides
- It is continuously being adapted and improved
- The principles are now being applied to other crops

System of Rice Intensification (SRI)

In Madagascar, SRI has increased yields from the usual 2-3 tons per hectare to yields of 6,8 or 10 tons per hectare.

Source: Nicolas Parrott, Cardiff University, 'The Real Green Revolution'

YIELDS



Source: Erick Fernandes, Cornell University

System of Rice Intensification (SRI)

SRI is based on the following principles that provide an adaptive foundation for its practice:

1. Encourage early and healthy plant establishment;

2. Minimize competition among plants;

3. Build up fertile soils that are well- endowed with organic matter and beneficial soil biota; and

4. Manage water to avoid both flooding and water stress

Source: Erika Styger and Norman Uphoff 2016, PRACTICE BRIEF Climate-smart agriculture

The System of Rice Intensification (SRI): Revisiting Agronomy for a Changing Climate

http://www.fao.org/gacsa/

SRI and Climate Change

Methane

Methane (CH4) is reduced between 22% and 64% as intermittent irrigation (or alternate wetting and drying, AWD) means that soils have more time under aerobic conditions

Gathorne-Hardy et al. 2013, 2016; Choi et al. 2015; Jain et al. 2014; Suryavanshi et al. 2013; Wang 2006; Dill et al. 2013.

SRI and Climate Change

Nitrous Oxide

Nitrous oxide (N2O) emissions increase only slightly with SRI or sometimes decrease as the use of N fertilizers is reduced. No studies so far have shown N2O increases offsetting the gains from CH4 reduction

Kumar et al. 2007; Visalakshmi et al. 2014; Vermeulen et al. 2012; Gathorne-Hardy et al. 2013, 2016; Choi et al. 2015.

SRI and Climate Change

Total Global Warming Potential

Total global warming potential (GWP) from rice paddies was reduced with SRI methods in the above studies by 20-30%, and up to 73% in one of the studies

Choi et al. 2015.

SRI and Climate Change

Carbon Footprint

Rice production's carbon footprint is reduced to the extent that less fertilizer and fewer agrochemicals are used. GHG emissions from producing, distributing and using these inputs equal about 5-10% of the global warming potential (GWP) from all direct emissions from food production

Vermeulen et al. 2012.

Adapting to Climate Extremes

After typhoon, FFS farmer in Dông Trù village, Hanoi Province, Viet Nam

Photo: Dr. Norman Uphoff, Cornell University

Crop Rotations

The Co- Benefits of SRI

- SRI ensures good well drained soil structures compared to wet paddy
- The stronger multiple tillers and root system gives rice more resilience to climate extremes
- Stronger, healthier plants are better at resisting pests and diseases
- Crop rotations are more effective with SRI as the rotational crops have a better soil structure
- Non grass/grain rotations especially with legumes will break pest and disease cycles and add nitrogen to the soil

Thank You
ありがとうございす
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