

## Herbicides are Key for the Sustainability of Rice Growing in South Asia

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In South Asia, rice is grown by manually transplanting seedlings into flooded soil. Flooding benefits rice by controlling the first flush of weeds and providing the rice seedlings a head start on subsequent weed flushes [1]. Weeds that emerge during the season are typically controlled by hand weeding.

Water and labor resource scarcity threaten the sustainability of rice production in Asia [1]. Rice consumes about 50 percent of total irrigation water used. Agriculture's share of water is declining due to competition with domestic household and industrial use. In Asia, the share of water used for agriculture declined from 98 to 80 percent in the last century and is likely to drop to 72 percent by 2020 [1]. Rapid economic growth has increased the demand for labor in nonagricultural sectors, resulting in reduced labor availability for agriculture. Both Bangladesh and Malaysia saw the proportion of their labor forces involved in agriculture drop by about 20 percent between 1961 and 2008 [1]. Many people prefer nonagricultural work to the drudgery of transplanting and weeding rice by hand. Because of increasing labor scarcity, labor wages have gone up, making the traditional rice production system uneconomical in many Asian countries (Figure 1).

Rice can be planted by sowing seeds in dry soil instead of transplanting rice seedlings into flooded soils. The dry planting system requires 35 to 57 percent less water and 67 percent less labor than transplanting seedlings into flooded fields [2],[3]. However, weeds are more problematic in the dry system because they are not controlled by flooding [1].

In dry direct seeded rice, the critical period of weed competition has been reported to be 15-45 days after seeding. If weeds can be suppressed effectively during this period, minimal yield losses occur [1]. A variety of herbicides have been screened and found effective for burndown, pre-emergence and post-emergence weed control in dry-seeded systems [1]. Direct seeding of rice has largely replaced transplanting in the Philippines, Vietnam, Malaysia, and Thailand. Virtually all rice farmers who practice direct seeding adopt chemical herbicides because they reduce weed control time in dry-seeded crops by 500 hours per hectare in comparison to hand-weeded transplanted rice [3],[4].

### References

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3. Mazid, M.A., C.R. Riches, A.M. Mortimer, L.J. Wade and D.E. Johnson. Improving rice-based cropping systems in north-west Bangladesh. *Fifteenth Australian Weeds Conference*. 331-334
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Weeds in rice,  
Vietnam



Rice in India - weedy at  
top, treated at bottom



Hand weeding rice  
in India

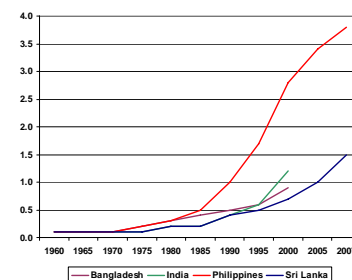


Figure 1: Trend of Farm  
Labor Wages (US\$ day<sup>-1</sup>) in  
Selected Asian Countries,  
1960-2007