

NEW PARADIGMS OF GROWING RICE TO ADDRESS SHORTAGES OF WATER AND LABOUR, AND GLOBAL WARMING POTENTIAL

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Asia is the home of about 4.3 billion people and 920 million living in less than \$1.25 per day. Intensive cereal system which is the lifeline of vast majority of Asians is facing dual challenges: shortages and untimely availability of water and labour. Among the cereals, rice is the most important food crop and heavily depends on large amounts of water and labour because the way it is grown. Globally rice is grown by transplanting on puddled (wet tilled) soil in more than 100 million ha annually. Rice consumes about 50% of total irrigation water in Asia and accounts for about 24-30% of the withdrawal of world total freshwater. Rice transplanting largely done manually is highly labour intensive requiring 25-50 person-days ha⁻¹. Rapid economic growth in Asia has increased the demand for labour in non-agricultural sectors, resulting in reduced labour availability for agriculture. Rice cultivation is also a major source of CH₄, currently accounting for 10-15% of all global GHG emissions from agriculture and 10-12% of the world's total anthropogenic CH₄ emissions. Our research has shown that the traditional practice of puddling (wet tillage) and transplanting of rice can be avoided by growing rice without soil tillage followed by direct seeding referred as dry direct seeding or aerobic culture. Much progress has been made in perfecting this technology and in developing a package of practices. Not only, aerobic rice culture saves water and labour, it allows crop residue recycling (which is otherwise burnt), reduces much of methane emissions, lowers energy use and increases farmer's profit. Avoiding puddling also improves soil structure which is an essential soil health requirement for the succeeding aerobic crops such as wheat, maize and vegetables.

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