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Increasing input resources use efficiency through appropriate weed management in Indian agriculture

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Indian agriculture plays a major role in the country's economy with 60% of India's population depending on agriculture sector. The central concern of Indian agriculture is low productivity, evident in modest average crop yields. India may need at least 20 million tons of additional food every year to meet the minimum food and nutritional demands of the growing population which is expected to be 1.7 billion by 2050. Thus the greatest challenge for Indian agriculture is to produce more with minimal input resources without causing imbalance to environment and in a sustainable manner. One of the approaches to face the challenge is production of crops with increased input resource use efficiency by managing impediments such as weeds, which are adaptable to all adverse environments and compete with the crops for utilization of land, labor, light, nutrients and water resources (Yaduraju and Rao 2013). In this presentation, an effort is made to give an overall picture of resources used in Indian agriculture, extent of competition by weeds for resources with crops and extent of losses caused by weeds and appropriate weed management strategies for enhancing input resources use efficiency of crops for attaining increased crop productivity and production to meet the present and future demands of Indian population.

METHODOLOGY

A review of available literature was made on input resources being used in Indian agriculture, the extent of losses caused by weeds in the inputs used in agro-ecosystems and the weed management strategies suggested for managing weeds and enhancing input resources use efficiency of crops for attaining increased crop productivity and production. In addition to the review, related experimental findings in Bhoosamrudhi program of Karnataka are incorporated. A few suggestions were enlisted for further enhancement of inputs use efficiency through appropriate weed management in Indian agriculture.

RESULTS

In India, weeds are one of the major biological constraints that limit crop productivity causing yield losses ranging from 10 to 100%, while competing with crops for natural and applied input resources. The weeds caused losses in inputs such as land, labor, monetary, nutrients, water and energy resources were reported to vary with the crop grown, amount and quality of inputs applied, geographic region, crop and weed management practices adopted. Utilization of weed smothering ability of component crops coupled with adoption of best weed management in inter cropping systems was reported to increase land use efficiency by Ã 47%. The NPK content of the weeds was reported to be higher as compared to the crop plants resulting in reduced nutrient use efficiency. Adoption of improved weed management in different crops was reported to increase nutrient use efficiency, which varied with varying associated factors. Technological adoption of micro-irrigation systems in different crops was reported to cause not only minimized weed problems, enhanced inputs use efficiency but also reduced expenditure on weed management. It is possible to increase in irrigated area by saving water through best weed management and utilize saved water for bringing more area under irrigation. In rice, improved weed management adoption was reported to cause reduced input use, increased energy output and energy use efficiency. Achievement of a mean 54% higher grain energy yield with a 104% increase in economic returns, 35% lower total water input, and a 43% lower global warming potential index was observed (Ladha et al., 2015) in a study conducted at different countries in South Asia, when integrated weed management was a component of best management practices, conservation agriculture and crop diversification.

CONCLUSION

The future weed management strategies and technologies of India should target at agricultural transformation aimed at an eco-efficient revolution with increases in the efficiency of scarce resources used to meet the food demands of increasing population while minimizing many negative environmental impacts associated with current food systems.

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