

# Bio-Fuel Crops Research for Energy Security and Rural Development in Developing Countries

Belum V. S. Reddy · S. Ramesh · A. Ashok Kumar ·  
S. P. Wani · R. Ortiz · H. Ceballos · T. K. Sreedevi

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**Abstract** Soaring prices of fossil fuels, geo-political issues and environmental pollution associated with fossil fuel use has led to worldwide interest in the production and use of bio-fuels. Both the developed and developing countries have developed a range of policies to encourage production of combustible fuels from plants that triggered public and private investments in bio-fuel crop research and development, and bio-fuels production. In this article, we discuss the potential benefits of bio-fuels in increasing the farmers' incomes, reducing environment pollution, the crop options and research and development interventions required to generate feedstocks to produce bio-fuels to meet projected demand without compromising food/fodder security in developing countries.

**Keywords** Agriculture research · Energy security · Bio-fuel · Ethanol · Bio-diesel

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B. V. S. Reddy (✉) · A. Ashok Kumar · S. P. Wani ·  
T. K. Sreedevi  
International Crops Research Institute  
for the Semi-Arid Tropics (ICRISAT),  
Patancheru, Andhra Pradesh, India  
e-mail: b.reddy@cgiar.org

S. Ramesh  
University of Agricultural Sciences (GKVK) Bangalore,  
Karnataka, India

R. Ortiz  
Centro Internacional de Mejoramiento de Maíz y Trigo (CIMMYT),  
El Batán, Mexico

H. Ceballos  
Centro Internacional de Agricultura Tropical (CIAT),  
Cali, Colombia

The United Nations (UN) Millennium Development Goals (MDGs) provide a blueprint for improving livelihoods (alleviate poverty), and preserving natural resources and the environment with 2015 as target date. None of the MDGs however, has a specific reference to energy security, though energy is the fuel of economic prosperity that is essential for alleviating poverty. Nonetheless, diversifying crop uses, identifying and introducing bio-fuel crops would lead to enhanced farmers' incomes, thereby contributing to *eradicating extreme poverty* (MDG 1) in rural areas, helping 75% of the world's 2.5 billion poor (who live on <US\$ 2 per day), and contributing to the environmental protection. Energy is required for consumptive uses (cooking, lighting, heating, and entertainment), social needs (education and health care services), public transport (road, rail and air), industries, and agriculture and allied sectors. 'Energizing' the agriculture production chain is critical to achieve food security, considering strong correlation between per capita energy consumption and crop yields in both developed and developing countries.

Fossil fuels do not provide equitable economic and environment-friendly benefits. Biofuels, produced from selected agricultural biomass, among other renewable sources provide sustainable and eco-friendly energy options that foster *environmental sustainability* (MDG 7) and offer opportunities to improve the income level of developing world's smallholder subsistence farmers who depend on agriculture for their livelihoods. However, not all crops offer equal environmental advantages. The crop, cultivar and production system and the processing technology are critical. Biofuel research-for-development will lead to new local, regional and national public-private *partnerships for development* (MDG 8).