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A REVIEW

# Sorghum in semi-arid tropics : Climate change impacts and adaptive strategies with agronomic perspectives

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## SUMMARY

Sorghum (*Sorghum bicolor* L. Moench) is a critical food and fodder crop in the semi-arid tropics (SATs), sustaining millions of smallholder farmers who face increasingly severe climate variability. While sorghum is inherently resilient to drought and heat due to its C,, photosynthesis, deep root system, and stay-green traits, projected climate change marked by rising temperatures, erratic rainfall, and more frequent extreme events poses significant risks to its productivity. This review synthesizes current knowledge on climate change impacts on sorghum and emphasizes agronomic and soil management strategies as the frontline of adaptation. Evidence from Africa, India, and Latin America shows that practices such as adjusting sowing dates, intercropping, mulching, conservation agriculture, in-situ rainwater harvesting, and integrated nutrient management can substantially reduce yield losses under climate stress. Case studies demonstrate that farmer-led innovations like zai pits in West Africa and watershed programs in India significantly enhance resilience and productivity. However, adoption remains constrained by socioeconomic, institutional, and cultural barriers. We argue that scaling adaptation requires integrated, farmer-centered approaches that combine scientific agronomy, indigenous knowledge, and technological tools. Strengthening sorghum-based systems is vital for food security, poverty alleviation, and climate resilience in some of the world's most vulnerable regions.

**Key Words :** Sorghum, Semi-arid tropics, Climate change adaptation, Agronomic strategies, Soil, Water management

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Sorghum (*Sorghum bicolor* L. Moench) is one of the world's most important cereal crops and a cornerstone of food security in the semi-arid tropics (SATs). Globally, sorghum ranks fifth among cereals after maize, wheat, rice, and barley, serving as a staple for over 500 million people and as a crucial livestock feed and industrial raw material (Borrell and Jordan, 2006). It is particularly important in Africa and South Asia, where millions of smallholder farmers depend on it as a major source of calories and income. Unlike other cereals, sorghum thrives under harsh, water-limited environments and is often grown on marginal soils where maize and wheat fail (Dossou-Aminon *et al.*, 2016). The semi-arid tropics, stretching across Africa, South Asia, and parts of Latin America, are defined by low and erratic rainfall (300–700 mm annually), high evapotranspiration,

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