



Helping farmers cope with climate variability and change in the regions of South Asia and sub-Saharan Africa

Anthony Whitbread

Director of the Resilient Dryland Systems Program, International Crop Research Institute for the Semi-Arid Tropics (ICRISAT), Denmark

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General Note

 Article is recommended to print as color version in recycled paper. *Save Trees, Save Climate.*

The International Crop Research Institute for the Semi-Arid Tropics (ICRISAT) has been in existence since 1972 with its headquarters in Hyderabad and research stations and offices in several sub-Saharan countries giving it a global outreach. Coping with climate, both variability and change, is often the No.1 challenge to farming in the semi-arid tropics. The program that I lead, Resilient Dryland Systems, uses multidisciplinary research (biophysical, social and economic sciences) to understand the farming systems in the semi-arid regions. Our research for development (R4D) approach is at a range of scales, field-farm-watershed. These R4D approaches are used to identify technologies and intervention strategies and their entry points that may then be applied at scale to reach millions of farmers.

Our research focus is therefore:

- Enhancement of farm income and risk minimization through better agronomic management (i.e. rotations, crop diversification, soil fertility, enhanced water use efficiency, organic and inorganic nutrient use).

- Generation of farm income through the enhancement of the synergies between crop and livestock enterprises (i.e. forages for livestock creating income from milk and meat, recycling of N from BNF, tree-crop-livestock systems, market linkage).
- Natural resource management through enriching and buffering water and nutrient supplies; protecting soils and moderating microclimates; reducing greenhouse gas emissions.

The approaches and tools we use are:

- Considering how smallholder farm households deal with drought and food insecurity based on the surveys, stakeholder consultations, bioeconomic modelling.
- The use of innovation platforms and value chain approaches that enable intervention strategies to be connected with market opportunities.
- The use of simulation platforms (e.g. crop-APSIM/DSSAT, bioeconomic-statistical and linear programming) to explore strategies for coping with drought and adapting to climate change- (Key Focal Area - Model based analysis)
- Improvement of vulnerability assessment and mapping of resource potential and land use using advanced geospatial techniques.
- Investigation of risk-reducing policies, safety nets, gender equity, early warning systems, and resilience and recovery strategies.

My talk will show data that indicates the climate has indeed changed in the past decades pushing some areas of India into drier agro-climatic classifications. But most of the focus will be on how farmers might better cope with uncertainty by making more informed decisions using information from seasonal climate forecasts, historical analyses of local climate, and a better understanding of soils and crops. I will use examples from the driest continent, Australia, to show that farming can be less risky by combining such sources of information. By working together as scientists, extension workers, policy makers and farmers, farming can become profitable and sustainable in almost any environment.