

# Opportunity in Change : Key Crops Rice and Sorghum

MICHAEL DINGKUHN

*CIRAD, BIOS Department, Montpellier, France*

Climate change (CC) is perceived either as a menace to our livelihood, peace and environment, or as a collective hype that will probably go away. But it can also be seen as change *per se*, real or imagined, in the conditions that set the frame for all human activities. The perception of such conditions has driven technological development ever since. Change in the conditions, or change in their perception as societal needs evolve, is thus a driving force of innovation. This is particularly true in agriculture, which a priori is not a struggle against nature, but rather an intelligent collaboration with nature to produce food and other things.

Of course CC is also a threat. Regional changes in precipitation will, for example, bring hardship to many poor regions (Fig. 1) and will require profound local changes of systems and geographical migration of crops. Such changes necessarily meant humanitarian and civilizational crises in pre-scientific and pre-globalization times. They will still mean that today in many parts. But as researchers we know that change, if it is gradual and not disruptive, also means: Mobilization of economic and technical creativity, Readiness for adoption of new solutions by stake holders including farmers... In short: When frame conditions change there is a chance for renewal, and readiness to question habitual dogmas.

Rice and sorghum systems together cover a large spectrum of situations with very different vulnerabilities and opportunities. The problematic of rice hinges on this crop's high water requirements and good adaptation to excess water, providing remarkable sustainability and productivity under flooded conditions: easier weed control, stability of soil pH and fertility, salinity control, transpirational cooling and more. The combination of CC and increasing competition for water conspire against the flooded rice crop. Water-saving management and breeding objectives are likely to have negative trade-offs because they aim at taking the crop out of its natural niche of adaptation. In fact, upland rice already represents such a compromise, and it is among the most vulnerable crops in terms of CC impacts. Should we "leave rice in the swamp" where it came from? No: (1) because biotechnology is moving fast towards molecular breeding for "new crops", requiring the development of ideotype and ecosystem management concepts now; and (2) because rice as a food has such a specific appeal and importance that it cannot be easily substituted.