

Foreword

A Call for Integrated Soil Fertility Management in Africa

The soil nutrient losses in sub-Saharan Africa are an environmental, social, and political time bomb. Unless we wake up soon and reverse these disastrous trends, the future viability of African food systems will indeed be imperiled. Dr. Norman Borlaug, 14 March 2003, Muscle Shoals, Alabama, U.S.A.

Rising fuel and fertilizer prices, high rates of rural poverty, underdeveloped farm input and commodity markets and a declining human capacity for soil and natural resource research continue to exacerbate the situation described by Dr. Borlaug. As a result and on a more optimistic note, soil health issues and the relevance of soil fertility research are now impacting upon the agendas of policymakers and developmental agencies. For instance, the Heads of States at the African Fertilizer Summit conducted in Abuja, Nigeria during 2006 recommended that current fertilizer use in Africa be increased from the current average of 8 to 50 kg nutrients ha⁻¹ by 2015. In response, The Bill and Melinda Gates Foundation (BMGF) and the Rockefeller Foundation are investing in soil health as a component of the African Green Revolution (Annan 2008) being implemented through the Alliance for a Green Revolution in Africa (AGRA). The AGRA Soil Health Program is building a foundation for agricultural sector growth by restoring African soil fertility through improved land management and increased access to fertilizers that sustainably increase crop productivity by 50-100%. The African Green Revolution operates on the assumption that half of the huge yield gap existing between SSA countries and the developed world must be closed through improved soil nutrient management and accompanying field practices while the remainder resolved through widespread adoption of improved crop varieties. African farmers, therefore, need better technologies, more sustainable practices, improved seeds and fertilizers to increase and sustain their crop productivity, and to prevent further degradation of their agricultural lands.

During early 2007, BMGF commissioned the Tropical Soil Biology and Fertility Institute of CIAT (TSBF-CIAT) to develop a series of concept papers on Integrated Soil Fertility Management (ISFM). These reports were intended for the Foundation's use in designing an African Soil Health Initiative. In response to that challenge, TSBF-CIAT assembled a team of fifteen experts drawn from Africa and elsewhere to develop a series of concept papers on 1) overall ISFM approaches for Africa, 2) developing appropriate ISFM recommendations for small-scale farmers, 3) improving ISFM practices and building research capacities, 4) increasing farmers' access to soil fertility management inputs and 5) the relationship between soil fertility management and human nutrition. These reports were developed over four months and the final documents delivered to the Foundation in early May 2007, consequently influencing the design of their soil health strategy.

Recognizing the potential importance of this information to research and development interests in Africa, these concept papers have been compiled and expanded and into this book. The book's purpose is not only to improve understanding of soil fertility management in Africa, but to do so in a proactive manner that serves as a call for action. This book describes the principles and practices of better managing soil fertility and sustaining crop productivity in Africa, but also the developmental processes necessary to propel ISFM into broader developmental and environmental agendas. In this way, this book not only captures current scientific knowledge of soil fertility management for use by agricultural researchers and educators, but also serves as a crossover publication for application by policymakers, development specialists and rural project managers at a time when the continent must respond to challenges posed by food shortages and continuing degradation of its agricultural resources. It is hoped that this book will contribute to more effective and widespread application of ISFM approaches and technologies, resulting in

more productive and sustainable agriculture, improving household and regional food security and increasing incomes of small-scale farmers.

The approach advocated to improve the soil fertility status of African soils is embedded within the ISFM paradigm and will be achieved in large part through the increase in agronomic efficiency as fertilizer use grows with time. ISFM is the *application of soil fertility management practices, and the knowledge to adapt these to local conditions, which maximize fertilizer and organic resource use efficiency and crop productivity. These practices necessarily include appropriate fertilizer and organic input management in combination with the utilization of improved germplasm.* Improving agronomic efficiency entails more intensive farmer management in areas such as maintaining mineral nutrient balance, correcting soil acidity, and making effective use of limited organic resources. Maximum benefits from ISFM practices and technologies can only be obtained within an enabling context, where such factors as farm input supply and produce markets, functional service delivery institutions, and progressive policies are in place. Translating this knowledge into practical land management strategies and empowering farmers through participatory technology development and adaptation is key to successful application of ISFM.

A broad and flexible approach to strengthening ISFM is envisaged which can result in large-scale impact within different agro-ecological zones over a relatively short time. Improving and disseminating ISFM in drylands through improved fertilizer placement, manure management and water harvesting is key within the Sahel, an area characterized by extreme poverty and episodic famine. Enhanced use of fertilizer within cereal croplands accompanied by maximum benefit from nitrogen-fixing legumes grown as intercrops or in rotation is an entry point for achieving food security and income generation in the moist savannas and dry woodlands of East, West and Southern Africa. Proven land management practices and, to a lesser extent, appropriate soil fertility products, are well established within these two agro-ecological zones of Africa, and it is only the lack of supportive policies and poor market development that impedes their widespread adoption. ISFM strategies appropriate to cassava, rice and banana production systems in the humid tropics are not as fully developed but investments in this area offer huge potential returns because significant gains in productivity of these crops are important for household food security and expansion of local and regional markets and trade.

Three accompanying developments are also necessary for the benefits of ISFM to become realized; improved capacity in farmer diagnosis and adaptive management of soil fertility constraints, greater access to farm input and commodity markets by small-scale farmers, and strategic policy adjustments that stimulate institutional and market response toward ISFM and its resulting crop surpluses. All the above cannot be realized without reviving and strengthening human and institutional resources. Recent reviews of the different stakeholders and partners involved in ISFM research for development in SSA point to the need to build capacity and to consolidate efforts at all levels from farmers to researchers and policymakers. To generate and deliver demand-driven knowledge and technologies, there is a need for a continent-wide strategy addressing ISFM that is supported by a Center of Excellence and networking platforms in SSA to foster partnerships between advanced research institutions, national agricultural research and extension systems, and the private sector.

Expanded funding for ISFM research adoption and scaling-up is critically needed given the urgency of addressing challenges posed by global climate change and food shortages on the continent. At the heart of that support must be a critical mass and diversity of soil management expertise throughout SSA. As the world grapples with the challenges of achieving food security it is crucial that foundations and government alike should invest at scale in reaching millions of farmers with ISFM technologies. The time for this is now. This book offers the way forward in achieving this goal.

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