



IPNI REGIONAL REVIEW

Sub-Saharan Africa Program

TACTICAL PLAN highlights & priorities

Key Regional Issues

Strengths:

- The economy of most SSA countries is agro-based, accounting for 30 to 40% of gross domestic product and almost 60% total export earnings.
- Agriculture provides direct and indirect employment for 70% of the working population.
- Economic growth is accelerating, reaching 5% in 2016, with agricultural growth of 3.5%.

Weaknesses:

- The majority of farms are subsistence-based and small-scale, ranging from 0.5 to 5 ha. Farmland degradation affects more than 30% of the crop area.
- Poor infrastructure limits access to fertilizer and other agro-inputs at affordable prices. Crop production is mainly rainfed and highly susceptible to climate change.
- Chronic food insecurity affects 27% of the 900 million people who live in SSA. Cereal yields have stagnated (< 1.5 t/ha) over the past 5 decades, despite increased food demand and a rapidly growing population.

Opportunities:

- Urgent need to increase agricultural production to meet food requirements of a rapidly growing population that will reach 2 billion people by 2050. Improved nutrient management will be essential in meeting this food security goal.
- There is great potential to increase crop productivity, in particular with improved nutrient recommendations that address the fundamentals of 4R Nutrient Stewardship
- Expand research and extension investments by governments and the fertilizer industry to increase fertilizer use from the current rate of 18 kg/ha, which is the lowest globally, to 50 kg/ha in the short-term.
- Diversify crop production from predominantly subsistence food crops to include more profitable high-value cash crops.



4R Stewardship

Developed successful regional programs for evaluation and dissemination of 4R knowledge based on field demonstrations, research and extension programs, and mobile phone 4R-training applications.

The 4R Nutrient Stewardship is now officially endorsed as the most effective concept for communication of best nutrient management practices by international research and development centers, including the Alliance for a Green Revolution in Africa, CIMMYT, IITA and national government research and extension institutions in several countries.

Nutrient Education

Developed and widely distributed a 4R extension handbook and wide-ranging extension materials for advisers and fertilizer industry agronomists in sub-Saharan countries.

Established a successful training program for researchers in eight countries, providing nutrient management training to 800 researchers from 90 institutions.

Improved Fertilizer Recommendations

Developed the "Nutrient Expert® for Maize" customized for Sub-Saharan Africa. Nutrient Expert® has been widely used by fertilizer industry partners and development organizations to develop fertilizer recommendations for more than 50,000 farmers in 8 countries.

Closing Yield Gaps

Initiated the oil palm "Best Management Practice" project in Ghana, resulting in 20 to 60% increased oil palm production at three plantations and hundreds of smallholder farms. Supported scaling of oil palm BMPs to other countries in West Africa (Nigeria, Gabon) and East Africa (Uganda).

Enhancing Sustainability

Established long-term experiments that provided guidelines on management of fertilizer, manure and conservation agriculture to enhance soil quality, crop productivity, and water and nutrient use efficiency.



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examples of IMPLEMENTING THE TACTICAL GOALS

Significant Partnerships:

- Through cooperation with the Alliance for a Green Revolution in Africa (AGRA), IPNI's leadership is widely recognized for nutrient management expertise. The AGRA-IPNI partnership has contributed to growth in fertilizer use in the SSA, which has increased from 13 kg/ha in 2010 to the current 18 kg/ha.
- IPNI has excellent collaboration with international research and development organizations including CIMMYT, IITA, IAEA, and IFDC. These partnerships enable IPNI to greatly expand research and educational activities to improve nutrient management practices.
- Cooperated with Solidaridad West Africa to encourage smallholder farmers to adopt oil palm practices that include using increased and balanced fertilizer applications. Significant gains in oil palm yields from adoption of BMPs and improved fertilizer management have resulted.

Educational Activities:

- IPNI established the certified 4R training program for crop advisors to build extension capacity for disseminating 4R knowledge to farmers. This program trains at least 300 crop advisors in six countries annually.
- More than 500 field-learning sites have been established across multiple location through the support of crop advisers, providing 4R training to farmers on nutrient management practices.

Engagement in Industry:

- Implemented fertilizer industry-supported research on the importance of balanced nutrient management for sustainable crop production. Major projects include oil palm best management practices, rice intensification, balanced nutrient management in maize-based systems, and adaptation of 4R practices for a wide range of cropping systems.
- Developed 4R educational products and extension materials used to support the fertilizer industry in promoting best nutrient management practices.
- Developed a database on crop production, yields, and current fertilizer use for eight countries in SSA that has been used to advise the fertilizer industry on opportunities for increasing crop productivity.

Research Leading to Impact:

- Fertilizer use in SSA has increased by about 40% between 2010 and 2016 after many decades of low and stagnant use. During this period, IPNI has played a vital role at the regional level to demonstrate how 4R practices can increase productivity and fertilizer use efficiency.
- At projects sites in Kenya, Ethiopia and Zimbabwe, adoption of 4R practices by more than 4,000 smallholder farmers has directly contributed yield increases of major crops by 30 to 60% and income by 20 to 40%.
- Closing yield gaps in oil palm plantations and smallholder farms in Ghana through improved management and proper fertilizer application has increased productivity by 30 to 40%.

Changes in Nutrient Practices:

- Supported the revision of fertilizer recommendations in four countries from uniform N and P recommendations, to site-specific recommendations that include K, secondary and micronutrients, and lime.
 - In Ghana, K fertilizer use in oil palm estates (covering over 30,000 ha) increased by 30% (8,000 Mt) in the three years of implementation of the IPNI *Best Management Practices* project. There is potential to further increase fertilizer use in estates by 40%. Additional opportunity exists to increase K use for smallholder oil palm production.
- The 4R project has contributed to inclusion of K in fertilizer recommendations for maize, rice, and wheat in Ethiopia and Kenya. Potassium use in cereal crop production is expected to increase from the current 5,000 Mt to about 50,000 Mt/yr in the two countries. Others countries in SSA are also revising fertilizer recommendations for maize, which will lead to increased use of nutrients.
- Development and dissemination of 4R principles has integrated the source, rate, time, and place components as part of recommendations given to farmers. Development of simple field tools, such as crop spacing strings and dollop cups has enabled farmers to effectively apply 4R principles.



Many of IPNI's smallholder training programs are centered around the Nutrient Expert® Decision Support Tool.

EXAMPLES OF IPNI IMPACT

A Growing Influence on the Success of Smallholders

Low fertilizer use and lack of access to information on best nutrient management practices are key factors underlying low crop productivity in sub-Saharan Africa.

IPNI's 4R Nutrient Stewardship program has supported thousands

of smallholder farmers in Western Kenya to increase crop yields by >30% through adoption of 4R techniques and site-specific recommendations based on the Nutrient Expert® Decision Support Tool.



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