Listen to technology

Dr Norman E Borlaug, SAA President

There are so many conflicting voices today about 'appropriate' technology for smallholder agricultural development in sub-Saharan Africa (SSA) that it must be very difficult for policy makers to know what to do. It seems that too much time is spent on 'processes' to assess farmers' circumstances and set research agendas, rather than on the generation of productivity-enhancing technology, itself.

We need to help farmers prosper and not just survive

Certainly, more-effective institutions and organisational structures are needed in SSA to transform subsistence-based agriculture into market-oriented forms. Institutional capacity building is extremely important.

It is also important for research and extension workers to dialogue frequently with client farmer groups, not only to be able to understand production problems, but also to learn from the farmers themselves. In the end, however, it will be the new technology that matters.

Confusion about fertiliser use continues in development circles. It makes no biological difference to the plant whether the nitrate ion it 'eats' comes from a bag of fertiliser or decomposing organic matter. Moreover, given the very low current levels of fertiliser use, and the alarming trends in declining soil fertility, a very strong case can be made that increased fertiliser use in SSA is one of the most 'environmentally friendly' things we can do. We need to shift our debate to how we supply adequate plant nutrients to the soil in the most efficient way possible, and bring an end to saddling African farmers with fertiliser prices two to three times world market prices.

A new array of high-yielding, early-maturity, disease- and insect-resistant varieties and hybrids are becoming available from research institutions, especially for rice, maize, wheat, cassava, and several grain legumes. These materials can make a big difference to smallholder production. They open possibilities for many new cropping patterns, involving food, cash, and green-manure crops.

Minimum tillage systems offer the great hope of checking soil erosion, conserving moisture, and reducing the back-breaking drudgery of hand weeding and land preparation.

Nutritionally superior maize varieties are being enthusiastically adopted by substantial numbers of farmers in a growing number of countries, especially in SSA. In the not too distant future, we may have high-yielding rice types available with higher levels of vitamin A and iron to improve nutrition.

The new tools of genetic engineering—if scientists are permitted to use them—will permit accelerated development of food crop varieties with greater tolerance to drought, heat, cold, and soil mineral toxicities; greater resistance to menacing insects and diseases; and higher nutritional quality levels. African governments should take care not to let these research products pass them by.

Of course, governments must prepare themselves with the necessary legislation and regulations to ensure proper testing of genetically modified crops. But they also must ensure that farmers have adequate access to the new technologies that come from these scientific developments.

There has been much "minimalist" thinking about African agricultural development in recent years. We need to shift the focus more towards helping African farmers to prosper and not just survive. Intensification of food production—using modern technologies on the lands best suited to this use—must be at the very heart of this effort.

We have the knowledge to permit African agriculture to prosper. Sadly, still lacking is the political, financial and institutional commitment to ensure that science and technology will be put fully to work in the service of the smallholder farmers and poor consumers of this vast continent.

About Sasakawa-Global 2000

Agricultural projects of Sasakawa-Global 2000 are operated as joint ventures of two organisations—Sasakawa Africa Association (SAA) and the Global 2000 programme of The Carter Center in Atlanta. SAA, whose president is Dr Norman E Borlaug, serves as the lead management organisation for the SG 2000 projects in Africa. Working through The Carter Center's Global 2000 programme, former US President Jimmy Carter and his advisers provide policy advice to national political leaders in support of programme objectives. Funding for SG 2000 projects comes from the Nippon Foundation of Japan whose chairperson is Ayako Sono and president is Yohei Sasakawa.

Feeding the Future

Working together for Africa's development

Yohei Sasakawa, President of the Nippon Foundation which funds the Sasakawa-Global 2000 (SG 2000) programme, greets Mallam Lawan Kadabara, a small-scale wheat farmer from Kano State, Nigeria.

Despite losing all his fingers from leprosy, Mallam Lawan Kadabara has successfully embraced the technology introduced through the SG 2000 project, in association with the Kano State Rural Development Authority (KNARDA)—and reports greatly increased yields as a result.

The Nippon Foundation, through the Sasakawa Memorial Health Foundation, has had a long-term commitment to the World Health Organisation's campaign to eliminate leprosy by 2005. The disease still exists as a public health problem in 10 countries.

Yohei Sasakawa, with SAA President Norman Borlaug, visited Nigeria in March—meeting with President Obasanjo in Abuja—before travelling to Malawi to see, in farmers' yields, the results of the SG 2000 project in that country.

Quality Protein Maize—Fulfilling the Promise

Quality protein maize (QPM) is, at long last, beginning to fulfill the promise that scientists originally saw in this type of maize, when it was first discovered in 1963. SG 2000 and its donor—the Nippon Foundation of Japan—have played a key role in bringing QPM to farmers' fields.

QPM has been developed using conventional maize breeding methods

Agricultural scientists have long had an interest in improving the protein quality of plant. Though not nearly as low in protein content as staple foods such as cassava, maize does have a relatively low protein content (about 9 per cent) and roughly half of that contains no lysine and tryptophan, two amino acids essential for building proteins in humans and other monogastric animals.

In 1963, Lynn Bates, a PhD graduate student working for Professor Edwin Mertz at Purdue University, discovered much higher levels of lysine and tryptophan, in two local maize varieties from the Andean highlands of South America. They were able to determine that these higher levels were due to the presence of a gene, called opaque-2.

The opaque-2 maize discovery initially stimulated considerable research interest and activity, with high hopes of bringing about substantial improvement in the nutritional welfare of maize consumers, especially in developing countries. But, as is all too often the case in plant breeding, a highly desirable trait turned out to be closely associated with several undesirable ones.

The initial enthusiasm soon gave way to disappointment. The opaque-2 maize kernels were dull and chalky, had 15-20 per cent less grain weight, and were more susceptible to several diseases and insects.

These formidable obstacles prompted most research programmes to curtail their work. Only a handful of crop research institutes continued their work, most notably the International Maize and Wheat Improvement Center (CIMMYT) in Mexico, with funding from the United Nations Development Programme (UNDP) for 14 years.

Using conventional planting breeding methodologies, the CIMMYT interdisciplinary research team—led by Dr Surinder K. Vasal, a breeder, and Dr Evangelina Villegas, a cereal chemist—slowly overcame the original opaque-2 defects while maintaining superior nutritional quality.

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