South Africa & CIMMYT

South Africa and CIMMYT: A 20-year partnership

- Maize and wheat together represent more than 80% of the total cereal area and production in South Africa. CIMMYT has been a research partner with South Africa since the mid-1970s, dedicated to improving the productivity, profitability, and sustainability of maize and wheat cropping systems, with a focus on serving resource-poor farmers.

Facts at a glance: maize and wheat in South Africa (averages, 1990-94)

Indicator	Maize	Wheat
Area harvested (million ha)	3.3	1.2
% of total farmland	32%	11%
% of total cereal area	60%	21%
Average yield (t/ha)	2.1	1.7
Total production (million t)	6.7	2.0
% of total cereal production	67%	16%
Per capita consumption (kg/yr)	178	61
Net exports (imports) (000 t)	317	(557)
Growth rate of production (%/yr)	1.4%	-2.8%
Growth rate of yield (%/yr)	4.0%	4.6%

- South African research institutes have received CIMMYT-improved maize and wheat materials through international testing since the late 1970s. Such exchanges have accelerated notably in the last several years. In the last ten years, CIMMYT's Mexico headquarters has shipped to South Africa 585 wheat nurseries (each containing numerous lines); CIMMYT has shipped 441 maize lines since 1994 alone.
- Maize is South Africa's single most important cereal crop. Historically, South African maize research has focused on hybrid development for commercial farmers; this sector is dominated by private seed companies. As the country's research priorities shift to meeting the needs of resource-poor subsistence maize farmers, interaction with CIMMYT on adapted materials is certain to grow in the foreseeable future.
- Over the last three years, more than 60 South African scientists from the public and private sector have visited CIMMYT's research station in Harare, Zimbabwe (the Center's largest regional office, focusing on Eastern and Southern Africa and on maize research in particular). These visits have led to requests and shipments of several hundred maize breeding stocks from CIMMYT-Harare to South African research centers, in addition to those which have been sent from CIMMYT-Mexico.
- Research on drought resistance in maize — conducted out of the Zimbabwe office — offers great promise for farmers in a region where rainfall has been highly erratic in recent years. CIMMYT's drought-resistant maize varieties show a 30% yield advantage over conventional materials under drought stress, while yielding at least as well as others when water is abundant. These same

materials are also more efficient in the utilization of available nitrogen and thus perform better under conditions of low soil fertility. CIMMYT's conventional breeding and biotechnology programs focus as well on increasing host plant resistance to maize insect pests. Maize that incorporates greater resistance to drought, to low soil fertility, and to insects increases both total production and yield stability in the face of these crop stresses. South African research institutes have been testing insect-resistant maize varieties from CIMMYT for more than ten years, and they began testing drought- and low-nitrogen-tolerant varieties in the mid 1990s.

- In the 1995-96 cropping season, 70% of South Africa's wheat area and nearly 50% of its wheat production was attributed to CIMMYT-derived cultivars. More than half of the wheat cultivars released in South Africa since 1980 had at least one CIMMYT parent.
- CIMMYT wheat varieties provide significant sources of resistance to stem and leaf rust — two of the most devastating wheat diseases. When a related disease, yellow (stripe) rust was first reported in South Africa in 1996, CIMMYT wheat nurseries provided an outstanding source of genetic resistance to this disease as well. Less than one week after the disease was identified in South Africa, complete wheat variety pedigrees and yellow rust resistance scores were received from CIMMYT-Mexico, which helped identify potential sources of resistance from South African breeding programs and abroad.
- Under the auspices of the European Union, CIMMYT has coordinated the Maize and Wheat Improvement Research Network of SADC * (MWIRNET) since 1994. South Africa is a member of MWIRNET, and is represented on the Network Steering Committee. Through MWIRNET, South African researchers are integrated into SADC regional activities which include screening and exchange of improved varieties, along with participation in regional traveling workshops, consultancies, and conferences.
- CIMMYT support to institution-building and human resource development in South Africa dates back to a visit to the Small Grains Institute in the mid-1970s by Dr. Norman Borlaug (1970 Nobel Peace Prize winner and then-director of the CIMMYT Wheat Program). Since that time, 15 wheat and maize scientists from South Africa have visited CIMMYT-Mexico as trainees, visiting scientists, or conference participants. Some 20 CIMMYT scientists have visited South African research institutes in turn.
- The ARC is Pretoria sent a South African researcher to a training course in the CIMMYT Applied Biotechnology Center in 1996, with the aim of helping establish and coordinate a training program in South Africa.

Spotlight on maize *(excerpted from **Agriculture in South Africa**, 5th edition)* :

"At present, maize is undoubtedly South Africa's most important field crop... more than a rugby field of maize is planted for every South African family every year....

"The Maize Board sells R1.5 million worth on the local market every hour of every day. In addition, we earn up to R2,500 million in foreign exchange on the international markets in good years....

"The maize industry stimulates the economy directly by ensuring a livelihood to more than a million South Africans, and provides secondary industries with over R1,500 million worth of business each year....

"Maize products are an essential part of the South African diet – 35% of the carbohydrates, 15% of the fat and 31% of the protein requirements in the South African diet are supplied directly by maize products...."

* Southern Africa Development Community.