

## Chapter 13

# THE ADOPTION AND IMPACT OF AGRICULTURAL BIOTECHNOLOGY IN SOUTH AFRICA

JOHANN KIRSTEN AND MARNUS GOUSE

*University of Pretoria, South Africa*

### 13.1 Introduction

South Africa is one of the few developing countries to adopt modern biotechnologies. As part of the adoption, South Africa has developed a number of active biotechnology research programs.

This chapter discusses the adoption of bioengineered cultivars of maize and cotton in South Africa, and offers a preliminary analysis of the economic and environmental impacts emanating from their adoption. We begin with a look at the seed and agrochemical input markets, which provide the backdrop for the commercial introduction of bioengineered cultivars.

### 13.2 The Seed And Agrochemical Input Markets

The South African seed market has an annual turnover of almost R1,000 million (SANSOR, 1998). Seed for maize and wheat production accounts for 66% of the total market. Vegetable seed is next with 18%, followed by pasture/forage with 13%, and flowers with 3%. In total, the South African farmer has access to almost 2,000 varieties of seed. Most of South Africa's seed requirements are produced locally under contract with farmers, utilizing extensive irrigation to ensure seed quality.

The agronomic seed market is dominated by hybrid maize, with some 230 hybrids available. More than 800 vegetable varieties are on the official lists, half of which are F1 hybrids (Van der Walt, 1997). On July 1, 1989, the South African National Seed Organization (SANSOR) was officially designated by the government as the authority to manage the Seed Certification Scheme. The organization has 90 members, including co-operatives and many of the

leading international and local seed companies such as PANNAR, Pioneer Hi-bred and Hygrotech.

There is also an active market for agricultural and crop protection chemicals including herbicides, insecticides, fungicides, and various other associated products in South Africa. The total retail sales in the crop protection sector during 1997 was R1,300 million. All agricultural chemicals are imported free of duty into South Africa. According to Customs and Excise statistics (1999), South Africa imported R215 million worth of insecticides (raw materials, some already packed), as well as R116 million of fungicides during 1998.

### **13.3 Evolving Input Market Structure in South Africa**

Since the democratic reforms in South Africa, a large number of multinational input manufacturers have invested in South Africa, expanding sales and increasing research efforts. Among them are Monsanto, Novartis, Bayer, Pioneer Hi-bred, and Zeneca. South African farmers have used many of these companies' products, as multinationals have either merged with local distributors/manufacturers or have acquired a stake (often a controlling share) in local agricultural input firms.

The trend of mergers and acquisitions in the agrochemical industry hit South Africa when Dow Chemical acquired the South African chemical company Sentrachem. The transaction provided Dow with total ownership of Sanachem, the world's third largest manufacturer of generic crop protection and pest control products. Sanachem is also the leading distributor of crop protection products in South Africa, with \$200 million in annual sales, 500 registrations worldwide, and a product line including glyphosate, triazines, mancozeb, aldicarb, carbofuran, and phenoxies.

Similar changes took place in the South African seed industry when two of the well-known and well-established local agronomic seed companies, Carnia and Sensako, recently became part of Monsanto (Carnia in 1998 and 51% of Sensako in 1999).

Apart from the Monsanto group, the other major suppliers of agronomic seeds (maize, wheat, and sorghum) are the PANNAR group of companies and Pioneer Hybrid. Together these three companies account for more than 90% of the market share. The PANNAR group, founded in 1958 in Greytown, is the largest supplier of grain seeds in South Africa. PANNAR also owns Stark Ayres, one of the largest suppliers of vegetable seed. Mayford Seeds and the OTK group (with 26% market share) are the other major players in the seed input industry. In the cotton industry there are only two firms, which supply