

The South African Fertilizer Industry — Can it meet the needs of the future?

M S Brunette, Kynoch Fertilizer Ltd.

Introduction

The South African fertilizer industry operates against the backdrop of ever increasing needs for food (clothing and shelter) of a rapidly growing population, the majority of which aspire to or demand a better quality of life, and inherently, an improved diet.

Although it is not the purpose of this paper to examine the complex problems of agriculture at the present time and the associated problems of the industries serving agriculture, it would be presumptuous to think that there are easy or quick solutions. Nevertheless one way or another these problems will be overcome in time, and will form part of the future environment in which agriculture and the fertilizer industry will operate.

In contrast to this macro-view the fundamental challenges that the fertilizer industry has to address, have probably not changed since John Lawes produced the first ton of superphosphate. In essence they bear on:

- the composition and quality of the product, and
- the most efficient means of producing it
- product cost, the competitive market price and product demand
- the availability and cost of raw materials

More recently, the environment should be added to this list.

What has changed, and will continue to change are the constraints and opportunities which may arise within the ambit of conditions prevailing at any one time in the future.

The Future and the Needs of the Future

The 1950s and 1960s were a period of unusual stability, judged by today's circumstances. For the world generally, inflation was largely unheard of, economic growth was of the order of 5% and the gold price was flat. Under these conditions, no person could have forecast with any degree of accuracy the changes, developments or problems that occurred in the 1970s and 1980s. The lesson from this is simple — the future is inherently uncertain. It is however by no means decided, and by discrete or collective endeavour can be influenced to advantage. No attempt is therefore made in this paper to forecast the future. The future is only examined in terms of a realm of possibilities, including:

- (a) The general conditions, developments and trends already initiated locally and globally which may have an impact on the local industry, within a time frame of approximately two decades.
- (b) The needs of the future, in terms of the projected domestic demand for food, and its possible impact on agriculture.
- (c) By examination of existing and future conditions, whether the fertilizer industry will be able to meet the domestic de-

mand for fertilizer, in the future, and some future possibilities in other African countries.

Future Trends

Changes in the pattern of International Developments

International developments have recently undergone important shifts which may have an impact on South Africa and Southern Africa in general. Some of these are:

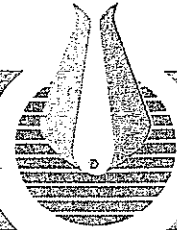
- (a) The developing political pragmatism, both in communist and non-communist countries.
- (b) The rise of the economies of a number of pacific-rim countries.
- (c) The emergency of the EEC as an economic power.
- (d) Changing world opinion of South Africa on the eve of negotiation.
- (e) Political and economic changes in Eastern European countries.

One of the most important implications of these changes is that Africa's developmental problems will increasingly become less important in the eyes of the industrialised nations, who are likely to channel more funds into Eastern Europe, with its pool of skilled labour and better developed infrastructure, rather than Africa or other third world countries. The Africa problem, is in even greater measure likely to become South Africa's problem and responsibility. The food situation in sub-Saharan Africa has worsened during the past decade, while economic development has lagged far behind population growth.

The New wave of Technological Innovation

A wave of technological innovation prevails at the present time and will drive the world system during the 1990s and beyond. There can hardly be any doubt that micro-electronics has been a block busting invention, and has heralded in the information age. It has been reported that the abilities of information processing technologies are constantly increasing and capacities are doubling every 2 1/2 years. Through micro-electronics, industrialised nations are also designing expensive (and less productive) labour out of big manufacturing systems.

Biotechnology today is where micro-electronics was a decade ago, and the indications are that it is set to take-off in the 1990s. The possibilities are enormous, and include insect and herbicide resistant crops, and of interest to the fertilizer industry, is the possibility, albeit remote, of biological Nitrogen fixation by non leguminous crops. The worldwide potential market for N-fixing maize, soyabeans, wheat and barley could be as high as \$14,5 billion at today's prices. The world's maize farmers could save more than \$2 billion annually in nitrogen bills and wheat



farmers up to \$6 billion. It has also been demonstrated that some tomato plants secrete an enzyme (acid phosphatase) from their roots which solubilises organic phosphates in the soil, thus potentially reducing dependency on P fertilizers. It must be recorded that biotechnology will lead agriculture into the next century. Apart from its obvious value in improving crop plants, advances will contribute to health (novel pharmaceuticals), horticulture and forestry, and to the generation of usable biomass and extracts thereof. There are already over 480 companies and 125 research organisations worldwide, actively involved in using biological means to pursue improvement in seeds, plant diagnostic tests and improved plants, for use in the food and feed industry.

Demographic Changes

Africa has the fastest growing population in the world, estimated to be in excess of 3% per annum, while in Kenya and Zimbabwe, it exceeds 4% per annum. Excessively high population growth places enormous demands on any country's ability to develop, and it would not be unreasonable to expect an increase in political instability in Kenya and Zimbabwe as a result of increasingly unmanageable unemployment.

In South Africa, there is no good agreement between various authorities on population growth, structure and urbanisation. Some of the available information is presented in Table 1 below.

Table 1. Greater South Africa* Population Projections

| | Population (millions) | | |
|---------------------------|-----------------------|------|------|
| | Present | 2000 | 2010 |
| Spies (1989) | 37 | 47 | NR |
| Blignault (1989) | ± 33 | 45 | 54 |
| Harrison & Fiske (1989) † | 38 | 49 | NR |

* Includes RSA and TBVC states

† Represents a synthesis of data obtained from the Human Sciences Research Council, UNISA and the Institute for Futures Research, University of Stellenbosch

NR Not recorded

In general terms it would appear that the population will increase at a rate marginally less than 3% per annum in South Africa until the year 2000, possibly decreasing slightly thereafter, due to increasing prosperity, greater urbanisation and better education of the black population in particular. It is possible by 2020, that 72% of the total South African population will reside in the larger metropolitan areas, and that the PWV metropolitan area (population-wise) could be one of the ten largest in the world.

Economic Development

South Africa has experienced a structural down swing in economic growth since 1975, with annual growth in GDP from 1975 to 1988 averaging 1,9% per annum, with a high of 5,6% (1980) and a low of -2,5% (1983). There is however a body of opinion which maintains that real growth is far higher than published data suggest because of the increasing size of the informal sector.

It is by no means inevitable, that the economic growth rate should in the future be as low as it has been in the past. Sunter (1987) believes that it could be as high as 10% per annum on the political high road, but diminishing in time as the economy grows larger. The primary reasons for this being that under a good political scenario, South Africa represents a major investment opportunity for industrial nations, because it is the gateway through which much of Southern and Central Africa could be developed. Other observers believe that under a good political scenario the growth rate could be between 3% and 5% per annum. It seems, however, that the solution to the historic problem of low economic growth lies largely within the arena of industry, politics, technological development and human resource development.

Personal Income and Spending on Food

South Africa is experiencing chronic food insecurity at the base of the food pyramid which threatens to impede political and economic initiatives. Personal savings have shrunk to minimal proportions, and the current savings ratio is of the order of 1,5%. Increase in real per capita disposable income — the most important determinant of consumer spending — has been negative since at least 1986, and seems likely to be so in 1990 as well.

Abstraction by Harrison & Fiske (1989) of data produced by the Institute of Futures Research and the Bureau for Market Research suggest approximately the same percentage growth in per capita personal incomes of both Whites and Blacks for the next decade, and double that level for Asians and Coloureds. Union demands and recent political developments may however change this scenario considerably. However, because the black population will have grown at a faster rate, the disposal of total personal income by blacks will rise from 28 to 33%. Should the economy grow at a rate faster than ±3% on average, the black share of consumption will grow more rapidly. Since consumers at the lower end of the economic spectrum spend a larger proportion of their earnings on food, than those at the top, the black sector will become increasingly dominant consumers in time. They already account for more than half of all food purchases. It is estimated that real expenditure on food could increase by 35% from the present time until the turn of the century, with annual increases approximately matching population growth, if the current level of food availability is maintained.

Environmental Issues

Worldwide concern for the environmental implications of development had its origins primarily in North America and Europe in the 1960s and 1970s, gathered momentum in the 1980s, spilling over into many other countries, including South Africa. The 1990s will certainly be the "decade of the environment", and any disregard for environmental issues by industry in particular, will result in inefficient utilisation of resources, public hostility, threat of legal action and alienation of markets. No industry can flourish under such circumstances. There has hardly been a better example of recent public hostility towards a company than that which occurred not long after the Valdez oil spill of the coast of Alaska. Forty one per cent of Americans were angry enough to consider boycotting the company concerned. Concern for the environment must not only be viewed from the viewpoint of industrial activity and the impact of fertilizers use on surface and ground water pollution but also in respect of promoting environmental conditions in which fertilizers can fulfil their purpose. Of paramount importance is the adequacy of water which will become an increasing problem in the future.

Estimated demand for farm products and the implications for agriculture

The long term development of South Africa together with the future of South African Agriculture is largely dependent on the trends previously described as well as political developments. What the food needs will be in the years 2000 and 2010 can be answered only conditionally, and on the basis of present knowledge. It must be borne in mind that a myriad of factors determine growth in demand for agricultural products, including, product prices, prices of alternative products, population size, per capita income and income distribution, changes in taste or preference, institutional factors (rules and regulations) and technological impact.

Demand estimates for agricultural products in Table 2, together with computed data on additional hectares required by the year 2000, must by no means be regarded as absolute. They merely serve to illustrate the point that the food requirements of the South African population in the year 2000 and thereafter are considerably more than they are at the present time, and that the main determinant of tabled increased demand is population increase and not necessarily income increase.

If South Africa is to remain substantially self-sufficient in food production in the next century, serious attention will have to be given to improving the production of some primary and intermediate crops. Whether this can be accommodated by improving yields sufficiently, is debatable. Whether this can be accommodated by a re-allocation of land is doubtful, but

nevertheless also debatable. However, it is almost certain that producers will strive to increase yields and that management, chemicals, fertilizer and better cultivars will be required in increasing quantities to sustain higher yields, rather than labour, machinery and fuel. It could also be argued that the farming industry could withdraw from several sectors of the export market in order to meet domestic demand. This is however an unlikely scenario, more particularly so if South Africa's political isolation diminishes with time. The writer is of the opinion that agriculture will increase production and seek new markets wherever possible. In addition to the above estimates it seems likely that an additional $\pm 150\ 000$ hectares of permanent or semi-permanent crops could be established by 2000, and would be almost entirely orientated to the export market — much of it probably sugar, but also deciduous fruit and sub-tropical fruit.

Implications for the SA Fertilizer Industry

Domestic Demand for Fertilizer

On the assumption that the previously outlined food demand scenario prevails, and that agriculture rises to the challenge, then fertilizer usage will undoubtedly increase. A guestimate of increased usage is presented in Table 3.

The estimated granular fertilizer capacity of the industry in 1989 (including mothballed plants) was 3,4 million tonnes. The above estimates represent capacity utilisation of 86% and 92% respectively, excluding exports, which in 1988 were 8,5% of capacity.

Table 2. Estimates of the domestic demand for farm products in the year 2000

| Product | Estimated demand tonnes x 1000 | Increase required based on average production last five years | Additional hectares required assuming no yield increase |
|------------|--------------------------------|---|---|
| Maize* | 7 750 | nil | 0 |
| Wheat† | 3 700 | 31% | 600 000 (dryland) |
| Wheat† | 3 700 | 52%‡ | 900 000 (dryland) |
| Beef | 700 | 16% | 450 000 § (largely dryland) |
| Mutton | 240 | 24% | 230 000 § (some irrigation) |
| Pork | 130 | 18% | — |
| Poultry | 800 | 73% | — |
| Sugar | 1800 | nil | — |
| Vegetables | 3800 | 35% | 40 000 (irrigation) |
| Fruit | 330 | n/a | n/a |
| Eggs | 300 doz x 106 | 50% | — |
| Milk | 2 700 litres x 106 | nil | — |

Source: Harrison & Fiske, (1989) } Modified by writer
Abstract of Agricultural Statistics 1988 }

* Includes animal feed + 25% strategic safety margin

† Human use only, + 25% strategic safety margin

‡ Based on Average Production last ten years

§ Assumes use of medium producing planted pastures in pre-finishing stage (beef) and fat lamb production (mutton)

n/a not available

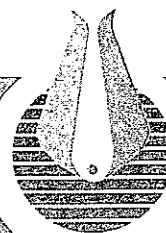


Table 3. Estimated fertilizer usage in the year 2000

| Type of Estimate | Plantfood Usage (tonnes) | | Approx. Physical Tonnes (millions) | Compound Growth rate % pa |
|------------------|--------------------------|---------|------------------------------------|---------------------------|
| | 1988 | 2000 | | |
| Conservative | 604 287 | 792 000 | 2,93 | 2,28 |
| Optimistic | 604 287 | 846 000 | 3,13 | 2,83 |

The Africa Market

FAO statistics indicate that the total plantfood imports by African countries in 1987 were 1,067 million tonnes. In 1988 RSA exports to Africa were approximately 30 000t plantfood or only 2,8% of the total. South Africa's role in Africa is changing and links are growing; recent reports indicate RSA involvement in 15 agricultural projects in Southern and Central Africa. If self sufficiency in food supply is a distant goal, self sufficiency in fertilizers seems even more remote. For as long as sub-Saharan Africa's forex earnings remain restricted, foreign aid will continue to underwrite a large proportion of fertilizer supplied to this region. Developing Africa may become an increasingly important part of the world fertilizer market during the next decade or thereafter, but it would be risky to predict any economic take off or green revolution at the present time.

The SA fertilizer industry is well located to supply African countries, although politics and their ability to pay mitigate against this at the present time. Provision of inputs together with technical assistance represents an opportunity which no other potential supplier possesses. In particular technical advice is possibly more relevant and the suitability of other items such as seed, probably unbeatable.

References

- ANON, 1989. Sasol-Pollution Free Water. *Technology SA*. June.
- ANON, 1989. Integrated Environment Management in South Africa. Council for the Environment. April.
- ANON, 1988. Agriculture in South Africa: Present Situation and Future Expectations. Economic Spotlight. Volkskas Ltd.
- ANON, 1988. FAO Quarterly Bulletin of Statistics. Vol. 1.
- ANON, 1988. Abstract of Agricultural Statistics. Dept. Agric. Economics and Marketing.
- ANON, 1990. Remember Africa. Editorial *Fertilizer International*, No. 282. Feb.
- BLIGNAUT, C.S., 1989. Food Nutrition Options and Related Strategies for South Africa. *Agrekon* 28, No. 3.
- BOTHA, T., 1987. Graanproduksie in die RSA en Bemesting: 'n Perspektief op Onlangse Tendense. *Fertilizer Review*. FSSA.
- GORGATTI-NETTO, O., 1989. Present and Future of Food Science and Technology in Developing Countries. *Food Technology*. Sept.
- HARRISON, J.E. & FISKE, S., 1989. Unpublished Report, Agri-Africa (Pty) Ltd. Pietermaritzburg.
- JOLIFF, G.D., 1989. Strategic Planning for New Crop Development. *J. Prod. Agric.*, Vol. 2, No. 1.
- KIRKPATRICK, D., 1990. Environmentalism: The New Crusade. *Fortune*, Feb. 12.
- LANCASTER, J.M., 1985. World Fertilizer Industry: Challenges and Constraints in the Recent Past and Future. *Proc. No. 223*. The Fertilizer Society. London.
- RANWELL, J.F., 1988. Trends in Fertilizer usage in South Africa. *Fertilizer Review*. FSSA.
- SUNTER, C., 1987. The World and South Africa in the 1990's. First Edition. Human & Rousseau/Tafelberg.
- SMITH, P., 1989. The Real Pesticide Story. *Amer. Veg. Grower*. Oct.
- SPIES, P.H., 1989. Makro-Tendense wat die Suid-Afrikaanse Veebedryf oor die Volgende 25 Jaar kan Beïnvloed.
- STUART, O. *et al*, 1989. Economic Prospects. Bureau for Economic Research. University of Stellenbosch. Oct.
- VENTER, G.C.H & RANWELL, J.F., 1989. Unpublished Report. FSSA. Nov.