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PRIVATE SECTOR: COMMERCIAL IMPLEMENTATION OF GENETICALLY MODIFIED ORGANISMS

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ABSTRACT

Prospects for commercial implementation of genetically modified organisms in Africa are small. As such, there have been only a few field trials, notably in the Republic of South Africa. The impoverished nature of the continent and lack of effective seed industries has led to low demand and acted as a disincentive to private companies. Moreover, major food staples in Africa such as cassava, millets, sorghum and bananas have not attracted private sector interest. Thus, very few biotechnology leads have been achieved, they often do not correspond with private sector needs because of their low turn-over. However, there are some prospects for a few genetically modified plants, such as herbicide-tolerant cotton and maize and insect resistant maize.

Key Words: **Biotechnology, commercialisation, private sector**

RÉSUMÉ

Les perpectives commerciales d'organismes génétiquement modifiés sont limitées en Afrique. Comme tel, il n'y a eu que quelques criblages en champs, notamment en Afrique du sud. La pauvreté du continent et le manque d'industries semencières efficaces ont entrainé une faible demande et ont eu un effect dissuasif sur les compagnies privées. D'ailleurs, les aliments de base en Afrique tels que le manioc, le mil, le sorgho et la banane n'ont pas attiré les structures de recherche multinationale. Ainsi, là où quelques exemples biotechnologiques ont été réalisés, ils ne correspondent pas souvent aux besoins du secteur privé à cause de leur faible profit. Toutefois, il y a des perspectives pour quelques plantes génétiquement modifiées, c'est le cas du coton et du maïs qui tolèrent l'herbicide, et du maïs résistant aux insectes.

Mots Clés: **Biotechnologie, commercialisation, campagnies privées**

INTELLECTUAL PROPERTY RIGHTS

The major issue to the commercialisation of genetically modified organisms (GMOs) is raised by Intellectual Property Rights (IPR), or lack thereof, and all countries in Africa will benefit from clear, enforceable protection for intellectual property rights for GMOs. Those developing or altering legislation should have input from the agricultural sector. This will provide the incentive for investment in the most productive sectors of agriculture by multinational companies and local entrepreneurial companies alike, providing products, food, income and tax revenues for the country. This will in future enable public

institutions to invest more in biotechnology research, orphan crops, education and extension programmes.

If the world population grows at 2% per annum while food production increases at 1%, how will we cope? The green revolution of high yielding small grain cereals is slowing down and maybe the next revolution should be termed the "Gene Revolution" (Schmidt, 1995).

Africa today holds 13% of the world's population and that number will double in the next 25 years. As food subsidies disappear in developed countries, surpluses will be eroded and as the world's population grows, increased food per unit area is the only long term sustainable solution to our food requirements. Crop protection is an integral part of current food production and must be analysed within the context of modern agriculture. If we are to avoid widespread famine and international turmoil, pesticides will continue, certainly in the short term, to play a critical role in high yielding production until displaced by alternative technologies.

In this paper, the agrochemical industry in Africa is examined, determining what trends are appearing, and drawing lessons from these experiences. The agricultural chemical industry in Africa is 3-4% of world business, 50% of which is in the republic of South Africa. It is legislated through the Food and Agricultural Organisation's of the UN (FAO) Code of Conduct (FAO, 1990) and the International Code of Conduct on the Distribution and Use of Pesticides established in 1985.

Most governments in Africa are signitories to the FAO Code. The aims of this Code are to: (i) Guide private and public sector groups engaged in pesticide regulation, production, marketing, storage, distribution and use, so that the principles of Good Agricultural Practice (GAP) can be upheld; (ii) Encourage collaboration between importing and exporting authorities to act in ways that will ensure that benefits derived from prudent use of agrochemicals are not overshadowed by health and environment problems; (iii) Stress the need for training programmes for both users and distributors, geared to safe and effective handling and use of pesticides; and (iv) Encourage governments which have not yet established effective regulatory procedures to do so, with assistance from the FAO, aid organisations and industry when necessary.

Eight years after issuance, the FAO carried out a review survey on the adoption of the Code. Eleven out of 45 countries had regulations/ registration schemes in place, namely: South Africa, Zimbabwe, Tanzania, Kenya, Cameroon, Niger, RCI, Senegal, Sudan, Egypt and Morocco.

In 1994 a further 13 countries (Zambia, Malawi, Ethiopia, Uganda, Madagascar, Benin, Cape Verde, Gambia, Senegal, Guinea Bissau, Mali, Mauritania, Burkina Faso, Niger, and Chad) initiated schemes. In other words, ten years after guidelines were issued 50% of African countries had started some form of legislation.

One of the major hindrances in the less developed nations is the lack of resources and the need to make continual pleas to donor agencies, aid bodies and international non-governmental organisations for funding, particularly to help support and teach people to establish pesticide regulation systems and legislation. It is not therefore coincidental that governments also requested industry support.

Individual national legislation is extremely costly, so that the idea of harmonisation of regulation is seen as practical. There are three ongoing initiatives at present: CILLS (Sahelian countries), where submission of data requirements is consolidated in Mali-Bamako, and field screening of a product anywhere in the region is considered valid for all nine countries; the initiative of the French Benin governments on a similar concept in Benin and four neighbouring countries; and the Organisation of African Unity (Addis Ababa) Initiative which is looking at regulation through regional harmonisation. Clearly, the benefits of a such system are obviously many.

COMMUNICATION

The agrochemical industry has a bad public image. The industry undertook a scheme to demonstrate change in the safe and effective handling of pesticides at all levels in three developing areas of the world. For Africa, the pilot country chosen was Kenya. The Safe Use Projects are with the strong involvement of industry associations, local government agencies, and the support of several international bodies. The biggest restraint to the whole system is the amount of money available.

There is tremendous demand for the transfer of technology both internationally and within the African continent. This open communication and commitment to hands-on change has met with little support.

As biotechnology raises fear of the unknown, it would be a worthwhile investment to spend an appreciable amount of time, money, and effort to informing the public and other interested parties of the potential opportunities biotechnology offers (without creating over-expectation). Information exchange in establishing national guidelines and public perception and awareness appears to be very different from taking the end product to market, where customer perception may be entirely different.

LANGUAGE

Any guidelines developed for Africa should be in English, French and preferably Arabic. In the agrochemical industry, regulation systems adopted at national level on the continent have generally followed the French system in francophone countries and a mix of British, American, Australian, and Canadian systems in anglophone speaking countries.

Any discrepancy in the approaches of the different members countries of the European Union (EU) may be transmitted to the biotechnology arena later in Africa. However, we should be able to benefit from the experiences in the USA, EU and other developed countries. With respect to communication, particular care should be taken to convey messages which are understood by the stake holders.

FIELD SCREENING

To date, there are limited centres for the field screening of organisms in Africa, namely nine in the Republic of South Africa and one in Egypt. It is clear that until regulatory proceedings are in place, industry, which funds two-thirds of agricultural biotechnology research, will put limited resources into Africa. Another reason for limited centres has been a previous lack of national demand. However, this is likely to change in the near future with centres being established in South Africa, Zimbabwe, Kenya and Nigeria.

There is also poor establishment of seed companies in the region. In Kenya, for example, where the Kenya Seed Company has had the monopoly for many years, competition must be encouraged, as it is in South Africa and Zimbabwe. The single biggest impact on food production in Kenya in the past 30 years has been the introduction of hybrid maize. Let us hope that there will soon be liberalisation of the seed industry with the possible opportunities that it will bring with it. Why should the flow of germplasm developed nationally not be available to institutions outside these traditional bodies, provided the right revenues are accorded to those developing bodies?

The first genetically modified plants which are likely to reach commercialisation in Africa are herbicide tolerant cotton (Calgene), herbicide tolerant maize (Monsanto) and insect resistant maize (Ciba). Often, these commercial products have at best limited international/regional priorities. Unfortunately major food crops such as cassava, sorghum, millet, and banana do not rank highly in the crop research of multinations priorities.

Many of the biotechnology research leads developed at national level are unlikely to correspond with private sector objectives. However, the idea of international broker services providing the link between the private sector and national institutions seems a very logical progression, in for example, finding ways of reducing post harvest crop storage loss, or potato or tuber storage longevity. Drought tolerant crop varieties are another lead that springs to mind.

Returning briefly to agrochemicals, the small scale farmer consumes less than 20% of pesticides sold. This may be a statement of purchasing power, but the same statement would be true for the unknown cost of biotechnological derived seed. The smallholder will continue to depend on public sector technology transfer.

CONCLUSION

Higher yielding agricultural technology will for the foreseable future depend on agrochemicals, perhaps as part of the Integrated Pest Management Systems. As GMOs and biotechnology develop in Africa they will become part of the agronomic system. The issue of intellectual property rights

needs to be addressed by policy makers, including those people in the agricultural sector. Harmonisation of positions with regard to requirements is more practical and affordable; so this is the way in which agrochemical industry regulation is likely to proceed.

Research priorities developed for Africa should be on food crops, as they are the fundamental needs of the continent. South Africa by virtue of its geographical proximity and economic wealth will likely play an increasing role in biotechnology development and transfer in the rest of Africa (with the possible exception of crops that are not major importance to them).

The private sector will continue to support biotechnological developments in Africa and in other developing countries. As structures are set in place to do business, so will private sector resources increase.

REFERENCES

FAO, 1990. *International Code of Conduct on the Distribution and Use of Pesticides.* Food and Agricultural Organisation of the United Nations, Rome.

Schmidt, K. 1995. "Whatever happened to the Gene Revolution?" *New Scientist* 7.1.95.