Cocoa commodity chain: economic context and research overview

Weak prices despite buoyant demand

With almost three million tonnes harvested annually, world cocoa production has increased sharply in recent years, primarily through three countries: Côte d'Ivoire—1,400,000 t in 1999-2000, i.e. 45% of world supplies—,Indonesia—which has exceeded 400,000 t with steady growth since the end of the 1980s—and Ghana—where the revival of the cocoa sector was confirmed with 435,000 t in 1999-2000.

This increase can barely keep pace with clearly growing consumption—worldwide grindings increased by more than 8% in 1999-2000—through strong demand for chocolate products in traditional major consuming countries, such as Western Europe, and in new emerging markets in Eastern Europe and Asia.

World production in seven of the last ten years was below consumption estimated from grindings, and production shortfalls are being predicted for the coming years. However, the volume of cocoa stocks cumulated over the previous years, which exceeded 1,200,000 t (i.e. over 40% of annual grindings), the accelerated liberalization of the Ivorian cocoa commodity chain, and changes in European legislation on use of the term "chocolate" have had a considerable effect on world prices. For instance, cocoa prices on the London exchange reached a record low in 2000. World cocoa prices are expected to improve in the short term, under the effect of strong demand but also through the low prices in 2000, which led to an upward revision of world consumption and a decrease in production, as plantings were abandoned and more extensive cultivation was adopted.

Cocoa Programme research priorities

The research priorities of the Cocoa Programme for the 1998-2002 period were defined from a foresight exercise carried out in the sector in 1997-1998. The current five priorities are periodically reviewed to take into account any changes in economic circumstances, scientific progress and changes in the programme's operational arrangements.

African cocoa cultivation: worrying prospects!

Cocoa is a cash crop found throughout the humid intertropical zone. However, Africa holds a major position with 70% of world supplies. The attention of the different stakeholders in the cocoa commodity chain is therefore focused on the future of African cocoa cultivation, particularly as the cocoa butter and chocolate industry, notably in Europe, has adapted its means of production to processing West African beans.

Plantations have been traditionally set up on cleared forest land in a pioneer front process, with low input farming systems. Yields per hectare are often low and the transfer of technical innovations is not always satisfactory. In these traditional systems, plantation productivity slumps after 25 to 30 years—this is the senescence phase—and farmers can only maintain their income by continually setting up new plantings on cleared forest land.

However, the reproducibility of this system is currently threatened by the exhaustion of available forest reserves and through the deterioration of production conditions: drier climate, the threat of *Phytophthora megakarya,* degraded soils, invasion of fallow land by very aggressive weeds, serious damage by insect pests, etc.

The development of competitive and sustainable cocoa farming systems in West Africa, and integrated control of *Phytophthora* pod rot are the Programme's top two research priorities.

In terms of sustainable farming systems, CIRAD is working with producing countries such as Côte d'Ivoire, Cameroon and São Tomé and Príncipe, and is drawing up projects with Ghana, Togo, the Dominican Republic and Nigeria. This research effort has been boosted by the recruitment of a farming systems agronomist and an entomologist.

For the control of pod diseases (*Phytophthora* sp.), research is being conducted in Côte d'Ivoire, Cameroon, Trinidad and Tobago and Papua New Guinea, notably in connection with an international project coordinated by the Programme, and backed by European cocoa industry (CAOBISCO). The importance and complexity of this research theme led to

the recruitment of an epidemiologist to strengthen the Programme.

Which cocoas for which chocolates?

For several years, cocoa consumption trends worldwide have been characterized by two phenomena: vitality in terms of volume (increase in grinding volumes) and segmentation in terms of quality. The increasing consumer demand for diversified products (organic products, products from specific areas, guaranteed origins with particular flavours, etc.) is a notable development in the market for agricultural produce from the temperate zone, but also from the tropical zone. This is particularly the case for cocoa. Greater production of such cocoas with specific qualities faces technical obstacles—for instance, fine cocoa varieties are often low yielding, susceptible to diseases and little is known of their genetic make-up—but also organizational problems: lack of market transparency, a marketing system offering no incentive for quality efforts; insufficient differentials, contractual relations between operators that need to be redefined, etc.

It is in order to take up this challenge that improved production, marketing and promotion of fine or flavour cocoas has been included in the Programme's research priorities, and that an agricultural economist specialized in marketing products with specific qualities has been recruited.

However, the quality concept for a food product such as cocoa is a complex set of characteristics that it would be wrong to limit merely to the taste aspect. These characteristics are technological, health-related, organoleptic and nutritional. Their consistency from one batch of cocoa to the next, or from one shipment to another is also very important. Processing yields, related to the size and fat content of the beans, or to the rheological properties of the cocoa butter, which depends particularly on the rate of free fatty acids, illustrate the technological aspects. The interest recently shown by the European Union in the existence of ochratoxins [1] in numerous foodstuffs also shows how important the health-related quality of chocolate is.

Thus, in order to fine-tune our understanding of the numerous factors governing the different quality aspects of cocoa, CIRAD carries out multidisciplinary research and development support operations in Montpellier, France, and in the main producing countries, in partnership with public or private organizations in the countries of the South and North: Côte d'Ivoire, Ecuador, Venezuela, Cameroon, São Tomé, Dominican Republic, Vanuatu, Madagascar, etc.

The Cocoa Programme at a glance

21 staff, including 15 researchers
Partner countries: France (Montpellier and French Guiana), Cameroon, Côte d'Ivoire, Ecuador, Papua New Guinea, São Tomé and Príncipe, Trinidad and Tobago, Vanuatu
Institutes:
France: INRA, IRD, University of Montpellier II
International: CABI, USDA, ICCO, IPGRI
Industries: Mars M&M's, FCC, CAOBISCO
Research themes:
- Sustainaibility of cocoa-based farming systems in Africa
- Integrated control of *Phytophthora* black pod rot
- Revival of fine cocoa cultivation in America
- Understanding of cocoa quality chains
- Utilization and preservation of cocoa germplasm

Germplasm characterization and exchanges

The different lines of research described above (productivity, sustainability, resistance, quality) call for cocoa germplasm. In order to be of use, the germplasm has to be collected, preserved, characterized and made available: this is the spirit of the Programme's fifth priority.

It is to that end that the Cocoa Programme, which now has its own germplasm collected from the wild in French Guiana and which has developed tools for genetic diversity assessment and accession characterization, has decided to take an active role in setting up an international cocoa germplasm network. This network is primarily based on the operations of the project entitled *Utilization and preservation of cocoa germplasm: a global approach* under the aegis of the CFC, ICCO and IPGRI, a project in which the programme is taking an active part alongside 13 other research organizations from 11 countries. ■

[1] Ochratoxins: toxic metabolites produced by fungi, found primarily in cereal-based products, but also in dried fruits, coffee and, to a lesser degree, in cocoa products.