A proposal for the implementation of a mechanism for mitigating volatility in cotton prices.

Nicolas GERGELY

A containment mechanism is essential

A survey of price trends for cotton over a long period reveals a structural downward trend of about 0.2 per cent annually over the past 40 years. This appears to have been more pronounced over the past decade, when the fall reached 2 per cent annually. The pace of decline has been faster in the case of cotton than of any other agricultural commodity, and this has compelled producers to constantly increase their productivity.

At the same time, the volatility of cotton prices appears to have increased over the past few years, notably under the influence of market distortions combined, in the case of the CFA zone countries, with fluctuations in the euro/dollar exchange rate. This volatility is deeply destabilising for African cotton industries and for producers in rural areas. Short periods of prosperity are too uncertain for producers to be able to invest long-term in their farms. When the effects of falling prices are passed on to producers, they translate into rural poverty and a dramatic drop in production, which further destabilises the industry. When the effects of lower prices are borne by the state or by public cotton companies, it often results in severe cash shortages, which have a dramatic impact on the operation of cotton industries.

As demonstrated by the crisis experienced in the early years of this decade, the sustainability of African cotton industries therefore requires the establishment of a mechanism designed to cushion the impacts of price volatility. At the same time, continuing efforts should be made to enhance competitiveness. Government intervention to stabilise the sector has been widely practised over recent decades but has proved to be largely inefficient; it can therefore be excluded right away.

*This paper was presented at the EU/Africa Forum held on 5-6 July 2004 in Paris, where it represented the position of the French Development Agency. A Cotton Working Group within the Agency is investigating the applicability of these proposals which, despite having being enhanced over time, have remained broadly consistent in their principles and philosophy.

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1 “Relevance of Risk Management Instruments for the Cotton Sector in West and Central Africa”, Gabriele Baecker, 2004
Another mechanism that has been proposed is an insurance system based on futures market instruments. However, preliminary studies on such a system are far from being conclusive, due particularly to its exorbitant cost when it comes to guaranteeing a significant minimum price over a number of years. This paper therefore examines an alternative mechanism: that of a self-insurance system managed by the industries themselves. This option appears to be the most promising, in light of embryonic systems already tested in some countries (Burkina Faso and Cameroon).

Desirable objectives and characteristics of the proposed mechanism

The problem of containing price volatility is closely linked to the mechanisms used to determine prices and margins, as well as to the management structures of the global industry. It is therefore in this global context that the mechanism should be placed.

The main objective of such a mechanism must be to cushion the impact of price volatility on the producer, while also pushing for a maximisation of the producer price. It is out of the question, however, to artificially maintain a fixed price for the producer that is disconnected from market trends. This would be financially unsustainable, because it provides producers with little incentive to achieve much-needed increases in productivity, and also because it generates additional distortions in a market that is already badly destabilised by the subsidy regimes of certain producing countries.
The mechanism must also contribute to the attainment of the overall objective, which is to enhance competitiveness. This means that it must encourage each actor involved in the industry to maximise their performance in terms of cost, while at the same time guaranteeing the funds for certain critical functions (research, agricultural guidance, road maintenance in cotton-producing areas, and so on). This critical requirement pleads for a mechanism based on standard fixed costs, rather than on the costs posted by cotton companies (which in any case will be increasingly difficult to monitor, given the widespread inclination to privatise companies). It also pleads for a clear distinction to be made between the costs posted by cotton companies that correspond strictly to their commercial and industrial activity and those costs of critical functions that may, under inter-professional agreements, be borne by the state or by the industry as a whole.

The mechanism must also be consistent and coherent with industry privatisation. Primarily this implies specific rules – for example, when determining prices, to avoid recourse to lengthy negotiations that might lead to political interference and economic instability. Secondly, it implies that cotton companies should invest, securing their results up to a minimum level in order to reduce their risk premium. Lastly, for the mechanism to win the confidence of the various actors involved, it must be collectively managed within the industry by an inter-professional authority, free of state intervention.

**Principles underlying the proposed system**

The proposed mechanism is inspired by the best practices observed in existing price setting systems, notably in Burkina Faso and Cameroon. It meets the requirements described in the previous section, and is based on three levels of intervention:

*A price smoothing mechanism (Level 1), managed by the producers themselves through their professional organisations.* Operation of this first-level mechanism would, like the one in Cameroon, be ensured by the producer payment system. The initial harvesting price would be determined by cotton companies (CC), based on their own perceptions of market trends and existing sales. At the end of the harvesting period, the final price would be determined by a formula based on the real cotton prices over the period. The difference between the final price and the initial price which, if positive, constitutes the make-up price, is paid to producer organisations (POs) by the cotton company, and not directly to the producer. The payment is deposited in an account that can be used by the POs to finance a premium that is added to the initial price paid to producers by the cotton company during the next harvest. The price actually received by the producer is therefore equal to the initial harvest price plus, as applicable, a premium decided by the PO and financed from the make-up prices it received during previous harvests.
As demonstrated by an analysis of the Cameroonian industry, this system allows a smoothing of the producer price, since the strategy of having the premium set by the PO tends, depending on the liquidity of the PO, to compensate for a possible decline in the initial price set by the cotton company. It offers the great advantage of making producer organisations really participate in the price setting process. Furthermore, it can be managed at a very affordable cost. Paying the premium, like the initial price, on delivery of cottonseed avoids having to pay an individual make-up price at the end of the harvest. Such payments can be very high in countries where this system is practised.

On the other hand, the cotton company bears the risk of a negative difference between the final price and the initial price, a condition that would force it to set the initial price at a cautious level.

\textit{A self-insurance mechanism (Level 2) managed by the inter-professional authority.} Such a mechanism must be capable of covering a moderate risk of falling prices. It would involve setting a minimum producer price corresponding to the minimum level at which production is viable, combined with a mechanism that, beyond that level, would trigger levies payable into a self-insurance fund. The fund would be managed by the inter-professional authority and would pay compensation when prices fell below that level. This minimum price should presumably be the same for all countries of the region, with possible variations depending on the geographical location of a country in order to take account of differentials in input costs.\footnote{According to a rapid calculation, this differential might be in the range of 10 per cent for the extreme cases of a coastal country such as Benin and a completely landlocked country such as Chad.} The minimum price would be set initially through a survey of production costs and comparative incomes in the cotton-growing areas, and would be adjusted every four or five years. In order to avoid any disconnection from market trends, the minimum price should also be adjusted downward in the event of persistently falling prices – for instance, by automatically applying a slight reduction after each harvest, thus activating self-insurance payments, but cancelling this after two profitable harvesting periods (based on various simulations, the reduction might be in the range of CFAF5 per kg).

\textit{A reinsurance mechanism (Level 3) managed with the assistance of donors.} Such a mechanism could be resorted to in the event of an exceptional fall in prices, and would be accessible to industries that follow rules ensuring sound management of the internal self-insurance system. It would thus constitute a powerful incentive for the actors involved to improve industry management and to establish efficient mechanisms for determining prices and margins.
Related terms and conditions for determination of prices and margins

Gross profit would be defined at the end of the harvest by the FOB average price (monthly average of Cotlook Indexes minus a CIF fixed sum), net of the following costs:

- the negotiated inter-professional unit cost of critical functions (road maintenance, research, supply of seeds, etc) paid to cotton companies, producers’ organisations or private service providers, as applicable;
- the fixed intervention cost of the cotton company (from collection of cottonseed to sale of fibre and seeds); this cost in turn comprises two sub-sets:
  - generic costs, which should tend to be fixed on the same unitary basis for all cotton companies in the region (industrial costs net of seed sales, overheads, harvesting period financing costs, etc.);
  - costs specific to the local context (mainly costs of fibre collection and carriage to port of loading, which depend on crop density and geographical location), which should be subject to a specific fixed cost based on each area-specific estimate;
- a minimum remuneration for cotton companies, calculated such that they can remunerate their capital investment at the market rate;\(^3\)
- the minimum producer price.

The gross profit (calculated at the end of each harvest) would then be distributed in four directions, based on percentages pre-determined by contract:

- taxes levied on the industry by the government;
- additional resources for the self-insurance fund;
- the cotton company’s share of profits;
- producers’ share of profits. This would be added to the minimum price to form the final price for the harvest. Should it be higher than the initial price, it would result in the payment by the cotton company of an additional amount to the producers’ organisation.

In the event that the harvest produces no profits, after all the elements described above have been taken into account, the deficit is borne by the self-insurance fund, which allows the cotton company to break even on its costs (though without any profit), on the basis of the minimum producer price.

These calculating mechanisms are illustrated in the charts below, based on:

- the estimated price for the 2003/04 harvest;
- the average costs observed in Burkina Faso, Cameroon and Mali over the past three years;
- the following hypothetical parameters: an initial harvest price of CFAF185 per kg from the cotton company; a minimum price of CFAF175 per kg from the cotton company; a self-insurance premium representing 30 per cent of gross profits of the harvest; a tax rate representing 13 per cent of profits; 10 per cent of the profits going to the cotton company.

\(^3\) This remuneration might be fixed as a unitary amount based on the net average fixed assets of the cotton companies in the region.
Based on these hypotheses, the self-insurance system will be triggered when the FOB average price is lower than CAF 697 per kg for lint (which corresponds to a CIF price of about CAF 737 or €1.12 per kg); beyond this ceiling, the industry would show profits, which would generate a reserve for the self-insurance fund.

Diagram 1: Calculation and distribution of the profit from the season (in the event of an excess)

4 - Values indicated in bold are expressed in CAF per kg of cotton lint.
If the reported FOB average price at the end of the harvesting period is insufficient to cover all the fixed costs and the minimum price, the self-insurance fund will pay the difference to the cotton company, as indicated in the previous chart. In the chart below, the average price is assumed to be CFAF660 per kg of lint, as fixed costs and the minimum price are the same as in the previous example.

**Diagram 2: Calculation of the contribution to the self-insurance fund (in the event of a deficit)**

### Simulations of the mechanism in operation

**Price trend scenarios**

To test the mechanism, simulations were carried out using data from the past ten years, according to various different scenarios of cotton price trends:

- **Scenario A**, corresponding to a repeat of the past ten-year cycle. In this scenario, the CIF average price for the next ten-year period will be CFAF870 per kg;
- **Scenario B**, more pessimistic, corresponding also to the past ten-year cycle but with a continuing downward trend of 2 per cent annually. In this scenario, the average price for the period is CFAF798 per kg;
- **Lastly, Scenario C**, corresponding to an inverted cyclical trend of scenario B. In this scenario, the average price is still CFAF798.
In all three cases, FOB prices are calculated by applying a CFAF40 per kg rebate on CIF prices.

The three scenarios are illustrated in the following graph:

**Graph 2: Illustrations of price trend scenarios**

![Graph showing price trend scenarios](image)

*Source: Nicolas GERGELY*

*Cost hypotheses and parameterisation*

This simulation was based on:

- the average price paid by the cotton companies of Burkina Faso, Mali and Cameroon over the past three years (CFAF240 per kg, excluding interest charges on borrowings, of which 30 per cent are for critical functions);
- a fixed rate of return on capital investments by cotton companies, on the basis of a net investment of CFAF300 per kg of lint (average for Sofitex and CMDT) and an interest rate of 10 per cent, giving a rate of return of CFAF30 per kg;
- a tax rate representing 13 per cent of the profits achieved by the industry (to which is possibly added a tax on cotton company profits);
- 10 per cent of industry profits going to cotton companies.
Thirty per cent of industry profits were retained as the rate of contribution to the self-insurance fund; as simulations progressed, this appeared to be the maximum level at which sufficient reserves could be formed without excessively squeezing the producer price.

The cotton companies’ initial price for the first harvest was set at CFA185 per kg; for subsequent harvests, it was assumed that, as cotton companies would be responsible for setting this price, they would take a cautious decision, based on the final price during the previous harvest and on price trends (the initial price can, however, not be lower than the minimum price).

The minimum price payable by the cotton companies is CFA175 per kg; by agreement, this is lowered by CFA5 after each intervention by the self-insurance fund and returns to its initial level after two profitable seasons, tracking market trends.

Production is assumed to be 100,000 tons of cotton lint (although only for the purposes of calculating in absolute terms the value of the various margins involved).

**Trends in producer price, minimum price and self-insurance fund**

Trends in the producer price, the minimum price and the self-insurance fund have been summarised for the three scenarios in the following table and graphs:

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<thead>
<tr>
<th>Scenario</th>
<th>Results</th>
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<tbody>
<tr>
<td></td>
<td>model</td>
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<tr>
<td>A</td>
<td>B</td>
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<tr>
<td>A</td>
<td>Same cycle</td>
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<tr>
<td>B</td>
<td>Same cycle-2%/an</td>
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<tr>
<td>C</td>
<td>Same as B; inverted cycle</td>
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</table>

It appears that in Scenario A (repeat of the past ten-year cycle), the mechanism allows a relatively stable average producer price of CFA197 per kg, which is more favourable than the prices actually seen in the past ten years. The minimum price drops slightly to CFAF170 per kg by the end of the period. The self-insurance fund is largely in surplus over the period, thus making it possible to prepare for any future deterioration in prices.
Under Scenario B (repeated cycle, but with an aggravated annual falling trend of 2 per cent), the mechanism is still able to ensure a relatively stable average producer price (though with a slight decline) of CFAF192 per kg, with a minimum price maintained at CFAF165 per kg. The self-insurance fund also succeeds in maintaining its position, despite a slight deficit by the end of the period.
Scenario C (same trend as B, but with an inverted cycle) features specificity when compared with previous scenarios by starting with years in which prices are unfavourable. In this context, the mechanism also allows a relatively stable producer price and a minimum price to be maintained of around CFAF187 per kg and CFAF165-170 per kg on average, depending on the year. The self-insurance fund, however, shows a deficit by mid-term (a deficit of CFAF12 million in the sixth year), though it regains equilibrium by the end of the period. This scenario points to a need to combine the mechanism with a Level 3 mechanism that would provide additional resources to the self-insurance fund.
These three scenarios show that the mechanism works, provided it is backed up by a reinsurance mechanism, even in a relatively unfavourable economic context such as the one experienced in the previous decade.

A simulation based on an annual falling trend of 3 per cent, on the other hand, reveals the limits of the mechanism in the event of a persistent catastrophic situation. To maintain the balance of the self-insurance fund, it would then be necessary to reduce the minimum price so far that the mechanism could not ensure the survival of the industry.
Impact of geographical location on the operation of the mechanism

These simulations were carried out for production areas in average geographical locations. In reality, costs for cotton companies will be higher in landlocked areas as a result of differentials in transport costs and, therefore, prices for producers and contributions to the self-insurance fund will be lower, as shown in the graphs below. It must be concluded that it is more difficult to achieve a balance in the self-insurance fund in isolated areas and that such areas, therefore, would have to resort more often to the Level 3 mechanism in order to maintain their self-insurance capacity.

Graph 6: Scenario B, comparative trends in self-insurance fund according to degree of area isolation

Source: Nicolas Gergely

5 This assumes, in landlocked areas, fixed costs for cotton companies of CFAF 260/kg (instead of CFAF 240/kg) and, in non-landlocked areas, costs of CFAF 220/kg.
Appeal of proposed mechanism to the various actors involved in the industry

Cotton companies

The mechanism allows cotton companies to secure a minimum rate of return on their capital investment (committed fixed costs), whatever the price fluctuations may be. This should encourage companies to invest in industrial infrastructure and to moderate their expectations in terms of profits, in anticipation of future hardship. Company profits will therefore depend on the cotton price and on the company’s own sales and management performance, in relation to the fixed prices used as the basis for calculating the theoretical result of the harvest and the volume of production that is processed (in other words, it will depend indirectly on its capacity to promote cotton-growing in its area). This is therefore a system that greatly encourages improvements in performance.

Simulations show average annual profits (after tax) that range from CFAF 2.8 billion to CFAF 3.1 billion, depending on different scenarios and assuming of course that costs and sales performance equal the fixed prices.6

At best, the mechanism has the advantages of setting price parameters that are known in advance and of minimising the need for negotiation within the industry, potentially avoiding uncertainty, conflict and political pressure.

Producers

Individual producers should be interested in such a mechanism, as it allows price regulation at a relatively high level and relative price security (especially through the Level 3 fund), while none of the existing mechanisms can do so.

The mechanism protects producers from a long-term decline in cotton prices, at a time when there continues to be strong downward pressure on them. This is a situation that can only be addressed by a permanent search for increases in productivity across the industry and a diversification of activities that reduce cotton growers’ vulnerability to the economics of cotton. Should productivity gains turn out to be insufficient to maintain prices beyond the level of minimum viability, the mechanism would inevitably tend to concentrate cotton production in areas that have a better comparative advantage. This is indicative of an economic logic that should be accompanied by specific measures designed to support conversion. However, the mechanism would offer the advantage, in this pessimistic scenario, of attenuating the severity of the crisis.

The purpose of the mechanism is also to strengthen producers’ organisations that:

- participate in determining producer prices, thus acquiring greater legitimacy vis-à-vis their members and greater power across the industry;
- receive, thanks to the make-up price paid to them, additional income, which they can decide to assign either to the payment of premiums for future harvests or to other actions of common interest.7

6 These results are of course adjustable according to the rules adopted for sharing profits from the harvest, without affecting the operating principle of the mechanism.

7 For instance, the simulations indicate by the end of period a surplus balance in the accounts of POs of CFAF 12 billion in Scenario A, CFAF 1.8 billion in Scenario B, and CFAF 6 billion in Scenario C.
Obviously, producers will be all the more interested in the mechanism if it is adequately backed by donors in order to ensure its sustainability.

**The state**

States would levy taxes under the proposed mechanism at two levels: on the result of the harvest and on the net profits of the cotton companies. The share of industry income retained by the state in the form of tax obviously depends on the tax rate on which the hypothesis is based. In any case, the mechanism offers the advantage of providing the state with a minimum income based on profits made by the cotton company. Beyond this minimum, the total amount of tax revenue depends on price levels, according to the tax rate applicable to the result of the harvest.8

**The need for an additional fund**

Simulations show that it would be impossible to maintain equilibrium in the self-insurance fund account throughout the period should the range of price fluctuations be notably worse than in the previous decade, or should the cycle start with several successive years of deficit (prior to the formation of the fund). A Level 3 reinsurance fund therefore appears to be necessary to stabilise the mechanism.

The purpose of this fund would be to cover price risks of a catastrophic and exceptional nature and not an aggravated falling trend, which can only translate into a corresponding decline in producer prices. The definition of the characteristics and desirable mode of operation of this fund calls for thorough reflection. However, the following are some of the avenues to be explored:

- the fund should be established outside the industry and might be managed either by a group of participating donors or by an international financial institution;
- it would come into play when there is a dramatic fall in prices, which has a macroeconomic impact on the countries concerned;
- it would be accessible to the industries subject to strict and adequate implementation of the self-insurance mechanism;
- its mode of intervention might consist of advances made to the industry on concessionary terms and repayable over a maximum period of three to five years, to allow a rapid replenishment of the fund following a disaster.

As for the amounts to be provided, a very brief preliminary risk analysis leads to the conclusion that, to be efficient, the fund should be able to mobilise about €0.1 per kg of lint produced by the participating industries (in order to offset a fall of €0.1 from the intervention ceiling). This represents about €100 million in total if all regional producers participate (with a production of 1 million tonnes), or €70 million for the three largest producers (with a production of 700,000 tonnes).

8 In the simulations, the share of the state amounted to CFAF2.5 billion annually on average in Scenario B (the most unfavourable) and CFAF3.1 billion in Scenario A (the most favourable).
The rules that govern drawing on the fund should also be studied in detail. Special drawing rights might be considered for each participating industry as a function of the volumes exported during previous harvests (each industry having, in this case, the right to equal support for each kilogram exported). A formula of this sort would favour the most vulnerable and geographically isolated industries. The amount granted per industry might also be tied to the average balance of the self-insurance fund over previous years, which should encourage industries to maximise such funds. The rules of intervention should also be conceived so as to allow the possibility of interventions during two successive harvesting periods – for example, by setting the maximum intervention in the first year at 70 per cent of the fund’s available resources.