

Privatisation of cotton sectors in Sub-Saharan Africa: Impacts are still short and worrisome

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1. Introduction

This paper is an attempt to analyse the impacts of the privatisation of cotton sectors in Sub-Saharan Africa (SSA). This region is dominated by a high concentration of developing countries where the issue of privatisation seemed to make more sense in the cotton sectors. As opposed to other geographic regions - in spite of the fact that government intervention is common however developed the concerned countries are and wherever they are situated - government involvement has taken the form of dominant state-controlled cotton agencies in all of the cotton-producing countries in SSA. These agencies were called cotton marketing boards in English-speaking countries and they were established by the end of the 1960's (Ghana, Nigeria, present-day Zimbabwe, etc.).

The privatisation of SSA cotton sectors is a process which began in the mid-1980's and is still ongoing. There are countries where we have enough hindsight from the time privatisation was launched to have some indication of its impacts, whereas this is not the case for many other countries. Thus, it is not easy to assess privatisation impacts from a pool of concerned countries with unequal privatisation backgrounds. There are also countries where privatisation has not yet started, e.g., Mali, Chad, thus, it would be highly risky to incautiously consider the results of these countries as reference guides to assess the impacts of privatisation, since many factors intervene in the performance of the cotton sectors.

The privatisation process has followed various modalities, hence the impacts being observed have more to do with the means of privatisation than the principle of privatisation itself. Furthermore, as privatisation (of firms) has sometimes been conducted along with liberalisation (of the economic sector), it is not easy to distinguish the effects of these two phenomena, which are commonly confused in the current debate in French-speaking SSA countries. Impacts which will be analysed deal with privatisation alone, liberalisation on its own or privatisation within a more or less partial process of liberalisation. For this reason, we will apply the notion of privatisation/liberalisation.

Our analysis will focus on French-speaking countries and non-French-speaking countries (mainly Nigeria, Ghana, Tanzania, Zambia, Uganda and Mozambique). The reservations emerging from some negative impacts that will be pointed out should not be understood as a dismissal of the privatisation/liberalisation principle, but rather as a contribution towards clarifying the conditions that could make this process become successful. It appears that in the short run, some positive impacts can be observed, but they are not necessarily sustainable. There are nevertheless negative impacts which pose serious threats in the long run. Privatisation/liberalisation should be coped with globally, there are activities that could be privatised/liberalised and other ones which could not: overlooking this fundamental difference would lead to the disappearance of some services at the expense of cotton sector competitiveness, farmers' welfare and environmental sustainability. No privatisation processes have been preceded by an analysis of what should or could not be privatised/liberalised. It is not too late to do so, provided that this issue is addressed urgently. The privatisation process must be location-specific, taking into account the social, economic and technical frameworks of each country. There is no panacea but promoting exchanges of experience is a key word to helping each country to figure out the best way to move forward efficiently.

Our contribution begins with the introduction of some specific facts about cotton in Africa in order to familiarise the reader with the cotton business on this continent. The second chapter

is devoted to the various modalities of the privatisation/liberalisation, the third chapter is focused on the analysis of impacts. The concluding part emphasises the issues to address in the view to helping cotton sectors become more efficient.

2. Generalities about African cotton commodity chains prior to privatisation

All the African countries share a similar history of voluntarist development of cotton production during colonial times¹. We will not dwell on this historical human drama, but this perception has evolved somewhat in certain countries where cotton development is treated as a "success story" for its positive impact on rural development. Positive impact of cotton production on food security is now well-documented in French-speaking Africa. Similar evidence is also arising in Mozambique² where such production resumed only less than a decade ago. Furthermore, it is also acknowledged that mineral fertilisation brought into cotton plots provides a positive contribution in decreasing the current mineral imbalance within existing cropping systems. These phenomena should not be generalised, as the adverse effect of cotton production on food crops has been reported in Tanzania, while low input/low output is a dominant strategy of agricultural production which includes the risk of soil mining.

2.1. Ginnery as a hub of cotton activities

Cotton cultivation leads to harvesting seedcotton with cotton fibre (or cotton lint) being attached to the seeds. Mechanical separation of the cotton fibre is implemented in ginning factories (ginneries). This operation is necessary to transform an agricultural product into a tradable commodity. For this reason, the ginning factory is commonly considered as the hub of all cotton production activities: this is the location of convergence of seedcotton, where production inputs (seeds and chemical products) can be placed at the disposal of cotton growers, where cotton lint is stored before being marketed and ginned seeds are available for oil extraction operators. This is the rationale that has led to common vertical integration within SSA cotton sectors with the former cotton boards playing a monopolistic role from seedcotton trade to cotton lint and seed marketing. The sequence of technical stages involved in the cotton production from seed to lint is represented in Diagram 1.

2.2. Technical constraint of pest management

A second common feature of cotton production is related to plant susceptibility to pests, and, in particular, to insects. This feature has been acknowledged since the early decades of this century, leading some outside observers to classify cotton as an impossible crop³. This susceptibility encompasses the risk of abuse in using chemical pesticides, a risk that was expressed eventually in some countries, with numbers of chemical applications reaching 20 to 30 for one cycle (the case of Central America in the 1970s, where cotton production has subsequently collapsed), whereas the number has seldom gone beyond an average of four in SSA. Nevertheless, continuation of cotton production has to deal with pest management in

¹ Hartmann, A., 1988. Le secteur du coton au Mali : sa viabilité économique et financière. Un calendrier de réformes. The World Bank, Washington, 16 p.

² Strasberg, P. (1997). Smaller cash-cropping, food-cropping and food security in Northern Mozambique. PhD, Michigan State University. 279 p.

³ Michotte, F. (1926). "Le mirage du coton L'impossible problème démontré par lui-même," Société de propagande coloniale, Paris. 48 p

most countries; this is a constraint which demands precise technical methods as well as favourable production framework for their implementation.

2.3. Cotton production: a smallholder's business

Cotton production is mainly conducted by smallholders in SSA countries. Except some eastern and austral African countries, this production is conducted exclusively on small farm holdings averaging a total of 5 hectares, among which no more than 30% is devoted to cotton cropping. Where cotton production on commercial farms exists, as in Zimbabwe, South Africa or Mozambique, smallholders' production represents an increasingly dominant part of total production. This attachment to cotton production derives from the cash advantages this production provides: in Mali, surveys reveals that cotton now accounts for 60 to 70% of the farmers' total income.

2.4. Variable reliance on the supply response to prices alone

A previous study⁴ has distinguished roughly two types of cotton development strategies in SSA, extensification (low input/low output) opposed to intensification⁵, or English-speaking *versus* French-speaking models. We would not debate the relevance of this fine distinction, the main message to retain is the attempt to go beyond price factors and to place the emphasis on the impacts of non-price factors that could made implementation of intensive production techniques available and attractive. Another lesson to point out is variable reliance on the supply response to prices: in English-speaking cotton countries, price is thought to be sufficient to push production upward, while in French-speaking countries there is at least an implicit assumption that price is only one factor among others in promoting cotton production. As privatisation/liberalisation is often justified by positive impact on the price being paid to cotton growers, the clarification given above helps us to understand that this process is built upon great reliance on supply response to prices.

2.5. Generally little cotton/textile integration

A final point is pertinent to the variable, but generally small, extent of vertical integration between cotton production and the textile industry, as this phenomenon may have an influence on the impacts of the privatisation of the cotton sectors. Except for Nigeria and, to a lesser extent, South Africa, the national industrial demand for cotton lint is small compared to production levels in most SSA cotton countries, making these latter totally dependant on the world market. In Nigeria and South Africa, where cotton production is below domestic demands, policy on cotton production (like privatisation) interacts with the concern of securing provisions of raw material for national industries and with macroeconomic measures of exchange rate policies and import restrictions. Mozambique is an example of a country having significant textile industry potential with large-scale investment being set years ago

⁴ Lele, U., et al. (1989). "Cotton in Africa: an analysis of differences in performances," The World Bank, Washington. 36 p

⁵ The intensification path being followed is assessed to be a factor to compensate lack of comparative advantage : "...and that cotton in Francophone countries is at least as efficient a producer of foregin exchange as in Nigeria even though the Francophone countries have been heavy users of imported technology, with all DRC's being less than one)" (Lele et al., 1989, p. 20)..

and which is suffering from severe underuse, as a consequence of current policy which overlooks the textile industry⁶.

3. Privatisation/liberalisation under variable processes

3.1. Similar rationale for moving out of parastatals

As pointed out above, cotton production in SSA was under the direct control of state-owned agencies or companies endowed with monopolistic power in the implementation of various functions (seedcotton purchase, input provision, ginning, marketing of cotton lint, etc.). Economic sector studies that preceded Structural Adjustment Policy (SAP) implementation demonstrated the management limitations of parastatals in SSA from the end of the 1970s onwards; the financial burden represented by the continuation of direct state involvement in many economic sectors was emphasised. Phasing out the cotton parastatals, along with others, was then put on the agenda in the SSA countries that committed themselves to SAP. Selling out the assets belonging thus far to the public sector was the strict expression of privatisation understood as a phenomenon of transferring property rights to private operators.

3.2. A continuing process spread over nearly two decades

The process took place by mid-1980s although it had been prepared since the end of the 1970s. In Zambia, the National Agricultural Marketing Board gave birth to LINTCO which remains state-owned but with an enterprise-minded objective. Most of the cotton boards were actually abolished in the 1980s (Nigeria and Ghana in 1986) but this phenomenon lasted until the mid-1990s (Uganda in 1994, Zambia in 1995).

Privatisation undoubtedly started in English-speaking countries. This process was completed by mid-1990s but it took a decade to accomplish. The phenomenon then gradually spread to other countries. It was also gradual in terms of the extent of privatisation within a given country.

Privatisation only started in French-speaking SSA countries from the mid-1990s onwards, and this phenomenon is not yet completed, either in terms of the countries actually involved or in terms of the functions being privatised. In Benin, private investors were permitted, from 1994 onwards, to set up their ginning factories, operating along with and in connection with the state-owned cotton company (SONAPRA). In Côte d'Ivoire, the CIDT joint venture (with the French CFDT) was split into three companies by selling off a great part of the ginning assets; each company was ensured of the monopolistic right of transforming the cotton production within a delimited area. Two companies were set up with international funds coming from cotton brokers. The government remained in the third company during a transitional period before recently selling its shares to a federation of cotton farmers' co-operatives. The withdrawal of the government in favour of farmers' institutions was also decided in Senegal and Burkina Faso in 1999. Mali, which has been the main producing country, is considering moving in the same direction. Privatisation of state-controlled cotton companies in Chad and Cameroon is on the agenda, although the modalities have not yet been defined.

⁶ Fok, A. C. M., 1995. The cotton sub-sector in Mozambique: institutional diversity, performance and prospects for improvement. CIRAD, Montpellier, 05/1995, 127 p.

It is worthwhile to point out that a strong reluctance⁷ to privatisation/liberalisation has been, and still is, expressed in these countries, giving rise to a passionate and polemic debate⁸ while such reluctance has not been publicly reported in English-speaking countries. Several factors could help understand this divergence. One important point is that privatisation took place in English-speaking countries when cotton production was collapsing and when people perceived the need for an institutional change. On the contrary, pressure for French-speaking countries to get involved into a privatisation/liberalisation process took place when cotton production was increasing, which led to a perception of dogmatism⁹.

3.3. A wide range of modalities and phasing of implementation

3.3.1. Heterogeneous modalities in non-French-speaking SSA countries

Privatisation did not only take the shape of selling out public companies to private investors. In Zambia, since 1986, private traders have had the right to set up their own ginning factories along with existing public ones. In Tanzania, there was a complicated sequence of measures corresponding to the phasing out of government involvement. In 1984, the monopolistic power of the Tanzanian Cotton Marketing Board was limited to the selling of cotton lint and cotton seeds on domestic and international markets. Until 1994, this Board was in charge of the seedcotton trade, at the village level, along with five co-operatives. A new organisation took over after that date: the Tanzanian Cotton Lint and Seed Board, whose functions were restrained to co-ordination of the cotton sector and to delivering licences authorising the purchase of farmers' seedcotton production. The facilitation role of the Cotton Board is even more conspicuous in South Africa as its main tasks have become to conduct price negotiations between the cotton sector stakeholders (communal and commercial producers, ginners, textile industries, etc.) and the supervision of the dispatching of the national production among the textile companies. In Zimbabwe, privatisation started as a coexistence between publicly- and privately-owned companies. The Zimbabwe Cotton Corporation was abolished in 1994 and gave birth to a government-owned company called the Cotton Company of Zimbabwe, while a totally privately-owned company was allowed to be set up (Cotpro). Another private involvement was realised in 1996 with the entrance of Cargill. Total privatisation was achieved by the end of 1996 when the government sold the majority of its share in the Cotton Company of Zimbabwe to communal farmers, commercial farmers, national investment trusts, institutional investors, the company's employees and the general public. In Mozambique, even before the end of the civil turmoil, the government decided to favour private involvement in the cotton sectors. This led to the establishment of joint ventures with international investors (Lonrho) or national ones, with the specific feature of allowing a delimited zone for each joint venture to implement its regional monopolistic right of purchasing farmers' production. In Nigeria, the abolition of the Cotton Board was decided along with a strong currency devaluation accompanied by import restrictions: this obliged the textile firms to address themselves to national production and to try to get involved in upstream integration (through direct production or contract farming) in order to secure their provision of raw material.

⁷ Zolty, A., 1997. Un débat ouvert devrait être initié sur la mutation de la filière coton en zone franc. *Afrique Agriculture*, Issue No. 249, issue juin 1997, pp. 59-61

⁸ It is through this debate that confusion was introduced between privatization and liberalization.

⁹ Hibou, B., 1998. *Economie politique du discours de la Banque mondiale en Afrique sub-saharienne*

Du catéchisme économique au fait (et méfait) missionnaire. *Les études du CERI* 39, pp. 1-44.

3.3.2. Partial, progressive and selective privatisation in French-speaking SSA countries

As indicated above, privatisation has been relatively recent, over a period of five years at the most. Referring to the privatisation of ginning activities, which is the common focus of cotton sector privatisation in SSA, recent experiences relate to a specific type of privatisation opening the cotton companies' capitals to farmers' institutions (Senegal, Burkina Faso). In such cases, the government does not withdrawal totally from direct control of the cotton sectors, leading some observers to contest the reality of privatisation. Entrance of real private firms only occurs in Côte d'Ivoire and in Benin, although some basic differences still remain. In Côte d'Ivoire, there is no government participation in the capital of the two private companies which were set up in 1997. In Benin, there is indirect government participation in the private ginning companies through the state-owned SONAPRA. It is noteworthy to underline the international status of the private investors in Côte d'Ivoire (international cotton brokers), whilst in Benin mainly national investors are concerned.

Apart from the sensitive issue of privatising cotton ginning, some activities related to cotton production have been submitted to privatisation. This is the case of chemical input provision. In Benin, it is claimed that such privatisation has been achieved since 1993/94 as distribution of these inputs (fertilisers, pesticides) is ensured by domestic traders. It could be questioned that this actually represents real privatisation as the traders who obtain a certain allowance to provide in a predetermined area, at a pre-agreed price, do not run any risk. In Mali, an experiment involving the transfer of input provision to the private sector was conducted in 1995 but was limited to herbicides, which were considered as a less essential input than fertilisers and insecticides.

Privatisation of transportation of cotton products (seedcotton and cotton lint) has been current in all the French-speaking SSA countries for many years. This is a phenomenon that dates back to the beginning of 1980. However, it is not total as all the cotton companies in these countries feel the need to have some degree of autonomy in the crucial activity of transportation in order to prevent total dependence upon a third-party operator.

Transfer of the credit function out of the cotton companies has taken place gradually over around 15 years in most French-speaking countries. Nowadays, most cotton companies only play an intermediate role¹⁰ between villages and conventional financial institutions.

More original is the process leading to a certain extent of research privatisation in Côte d'Ivoire where the CNRA is a shareholding body, not exclusively controlled by the government. As a matter of fact, a federation of farmers' co-operatives has taken part in this new research institution.

3.4. Few explicit objectives attached to the privatisation process

With regard to the privatisation process in English-speaking SSA countries, it took place during a period when the inefficiencies of the parastatals were being criticised. The implicit assumption was that transfer of responsibility for management to private traders would encourage gains in performance and would alleviate a financial burden on the government. Indicators of performance gain were seldom specified, but one can assume that the main criterion was based on the production volume as such production was collapsing.

¹⁰ In Mali, after the inputs are provided at the village level, the cotton company is paid by the BNDA (Banque Nationale de Développement Agricole) which in return gets back its money during the seedcotton trading period when it has to pay the villages for the cotton production they have sold.

Referring to the debate over the performance of state-controlled monopolistic cotton companies in French-speaking SSA countries, there is a confusion between privatisation of existing firms and liberalisation of an economic sector. International funding bodies which have questioned these companies' performances from the beginning of the 1990s are somewhat responsible for this confusion. The World Bank's precise preference for a liberalised cotton sector comes out of rather recent study reports¹¹. It is expected that such liberalisation would favour cotton growers' income, in compliance with the goal of poverty alleviation, as a consequence of the competition between private ginning factories. Payment of higher prices to farmers is assumed to push them to produce more. Better cost control, through private management of cotton companies, in addition to ending subsidies to the oil and textile industries (assumed to be at the expense of cotton producers) is expected to lead to greater competitiveness in selling cotton lint in the international market. The issue of achieving or maintaining a satisfactory level of lint quality as a factor of competitiveness is seldom addressed. There is some concern about preserving the achievements obtained thus far in the area of pest control, in compliance with the goal of environmental sustainability. How this could be obtained under a liberalised cotton sector is not clearly indicated.

With regard to the objective of cotton sector liberalisation, most English-speaking SSA countries have achieved the goal of a liberalised sector, at least in appearance (Ghana, Nigeria, Zambia, Zimbabwe, Tanzania). On the contrary, in French-speaking SSA countries, the free market is not operational, even in countries where there are functioning private cotton companies. Monopolies, either national or regional ones, still prevail and the purchase price of seedcotton remains administratively set.

3.5. Unequal but rather short period of retrospection for a proper assessment of privatisation/liberalisation impacts

Total privatisation took time before becoming operational in most SSA cotton countries. Only in Nigeria did privatisation occur as an instantaneous and total transfer of public assets to private traders. This provides a background of around 15 years which has been used in a few academic works. This was also a process of instantaneous liberalisation through government withdrawal from most of the cotton issues. In Ghana, although government withdrawal was neither total nor instantaneous, we have a similar background period, which is more documented. In other countries, total privatisation remains a recent phenomenon. Thus, we have varying periods available to assess the impacts of privatisation.

Proper assessment is complicated further by the confusion that has been introduced between privatisation of firms and liberalisation of cotton sectors. As international funders are referring more and more to the general goals of poverty alleviation, international competitiveness and environmental sustainability, we are trying to assess the impacts of the privatisation process we are analysing with reference to some indicators associated with these goals.

¹¹ Pursell, G. and Diop, M., 1998. Cotton policies in Francophone Africa. Why and how the "filières" should be liberalized. World Bank, Washington, Feb. 23, 1998, 43 (+annexes) p.

Varangis, P., et al., 1995. What does experience in other cotton producing countries suggest for policy reforms in Francophone Africa. The World Bank, Commodity Policy and Analysis Unit, Washington, 50 p.

4. Impacts of privatisation

4.1. Regarding international competitiveness

4.1.1. Production indicator: Heterogeneous supply response to privatisation

Cotton production (see attached graphs) has clearly been increased in some countries but not in all, whilst the extent of the increase is variable. In Ghana, where privatisation has a longer background, cotton production has actually increased very significantly, but its level (around 12,000 tons of lint) is lagging far behind Benin (which is a smaller country) or Mali (which has reached more than 200,000 tons of lint). Zambia has shown spectacular cotton development during the past few years, with a production level that is beginning to be significant (30 to 40,000 tons of lint). Similar observations can be made in Mozambique for a longer period (lint production of around 30,000 tons in 1998), but here privatisation was implemented under a scheme of regional monopoly allowance.

With a similar privatisation background, Nigeria experienced an increase in production during the first ten years following the cotton sector privatisation, but this production is falling again in spite of the favourable situation of high domestic demand. Uganda is facing signs of a new decline in production after a short period of renewal with production levels (20,000 tons in 1997) remaining very far below the record productions obtained in the beginning of the 1970s (85,000 tons).

Total liberalisation achieved by the end of 1996 in Zimbabwe has not led to a clear change in production volume. Tanzania is particular in the fact that gradual privatisation in recent years has led to a sharp decline in production, with production being divided by three (45,000 tons in 1997 against 106,000 tons in 1992).

As compared to French-speaking SSA countries where liberalisation has not yet taken place, whether there has been some privatisation (Benin, 141,000 tons in 1996) or not (Mali, 220,000 tons in 1998), production increases in the English-speaking countries examined above appear to be limited and more unstable. In other terms, privatisation may lead to cotton production moving upward in some circumstances, but this is not the only way to reach such a target or to do it most efficiently.

4.1.2. Quality indicator: risk of international depreciation

There is no single trend in the evolution of the international appreciation of the cotton lint between the various SSA countries under examination. Zimbabwe achieved very positive appreciation of its cotton lint quality well before the complete privatisation of its cotton sector. This appreciation does not seem to have evolved negatively since then. The cotton classifying system remains cited as a reference to be followed in Africa. Furthermore, international quotation of Zimbabwean cotton lint has been limited only to fibre lengths greater than 1"1/8 from 1998 onwards¹². It is however difficult to link this achievement to the complete privatisation process which remains too close in time.

On the contrary, in countries where privatisation has a longer background, depreciating quality has been observed with nobody in charge of the classifying task (Ghana, Nigeria). In

¹² For countries where there is simultaneous cotation on lint of 1"1/32 and 1"1/8 length, the premium associated to the greater length of 1/32" could be a price gain of 2 to 6% respectively for Australian and francophone in average during the last 2 years.

Nigeria, ginners under competition are more moved by the amount of seedcotton they can buy and any deterioration in seedcotton quality is feared to impact negatively on this amount. In Tanzania, seedcotton trade or payment to farmers can be delayed for so long (from several months to more than one year) that there is no longer any incentive for farmers to pay any attention to the cotton quality in spite of existing modern equipment (HVI or High Volume Instrument), which is no longer running properly.

In all of the French-speaking SSA countries, there is an effective classifying system and no quality depreciation has actually been reported. There are certain reservations concerning affiliation to conventional and manual classifying systems, whereas there is clear evidence that mechanical, high volume and high speed, and multi-criteria classifying will become the new international standards in the near future. There is a challenge to move towards a modern classifying system which most French-speaking countries seem to ignore (Benin is an exception in this area with its two recent sets of HVI). It is stated that in Benin around 40% of the production is nowadays classified at a lint length of 1"1/8, this is a significant increase which is associated to the move towards HVI classification.

4.1.3. Productivity indicator: stagnation of land productivity at the most

Surveys to assess the evolution of labour productivity (or its indicators) are scarce, and the existing ones we know of are related to French-speaking countries. In these countries, added-value related to cotton production is stagnating at the surface unit basis, after a significant increase due to currency devaluation.

Table 1 : Evolution of added-value per hectare, FCFA/ha

	Bénin	Cameroun	Mali
1978			37901
1979			32635
1980			50282
1981			29604
1982			48811
1983			54400
1984			71607
1985			66309
1986			73266
1987	111049	165726	81614
1988	55417	133200	72141
1989	57473	155571	74993
1990	72692	77124	64149
1991	80715	79340	76040
1992	93220	89933	70106
1993	90295	80507	76006
1994	97834	131932	74370
1995	104478	148340	94387
1996	136993	170472	144301
1997		157189	134239
1998			120680
1999			133940

Source : G. Raymond and M. Niang, 1992, G. Raymond, 1997, M. Fok, 2000

In most countries of francophone Africa, cotton acreage per labour unit has increased significantly at the same time: in Mali, the average cotton area/cotton farm has doubled since 1986 and has induced a significant increase of the added-value per farm.

Table 2 : Added-value per farm boosted by increased cotton area, FCFA

	Value-added	
	per hectare of cotton	per cotton farm
1978	37901	47957
1979	32635	47296
1980	50282	78930
1981	29604	44076
1982	48811	65846
1983	54400	95170
1984	71607	124816
1985	66309	118595
1986	73266	146495
1987	81614	162682
1988	72141	132800
1989	74993	159310
1990	64149	122892
1991	76040	138110
1992	70106	142344
1993	76006	167591
1994	74370	139574
1995	94387	218181
1996	144301	369071
1997	134239	386234
1998	120680	376183
1999	133940	397535

Source : M. Fok, 2000

We can hence assumed that added-value per labour unit has thus evolved favourably. Each labourer could, however, have been working more, so that the progression of added-value per labour-time unit remains uncertain. This is a matter of controversial debate that needs to be clarified by reliable assessment of labour investment.

Yield, as an indicator of land productivity, is often used as a productivity estimate. This indicator is to be taken with serious caution, as its reliability is dependent on an estimation of the cotton acreage. It is common to acknowledge that, under a liberalised system, with no organisation committing itself to handling the production statistics, available data on cotton acreage, and hence cotton yield, are highly unreliable (example of Tanzania).

In most French-speaking SSA countries, cotton companies continue to consider handling statistics a major task. Although certain difficulties remain in estimating acreage in these countries, which leads to questioning the reliability of the levels of acreage and, hence, of the yield, one can assume that the evolutionary trend is more reliable, provided that estimation methods remain the same throughout the period under consideration. This trend has been observed to be stagnating, if not decreasing, in spite of maintenance of effective input and credit provision and the continuation of extension work.

Table 3 : Trend of yield stagnation in francophone countries

	Bénin	Cameroun	Mali
1987	1291	1295	1338
1988	972	1200	1336
1989	991	1571	1316
1990	1154	1169	1234
1991	1187	1202	1358
1992	1180	1267	1275
1993	1328	1278	1310
1994	1179	1233	1200
1995	1161	1177	1098
1996	1212	1226	1213
1997		1147	1083
1998			1058
1999			1033

Source : G. Raymond and M. Niang, 1992, G. Raymond, 1997, M. Fok, 2000

Input and credit provision, continuation of actual extension work have become virtual in most of the English-speaking countries engaged into a liberalisation process (Nigeria, Tanzania, Zambia). Because of the ethical questions that could lead a farmer to get input credit with one cotton company and to sell his production to another company, input is no longer provided in some countries (Tanzania) or some parts of other countries (Zambia), but also in Mozambique. In Ghana, private cotton companies have collectively decided to directly deduct input costs from the single seedcotton price they propose. Such arrangements seem to prove somewhat effective in controlling free-rider behaviour, but it shows clearly that the competition between private operators that liberalisation is supposed to create is not functioning.

Seeds are the minimum input to provide to cotton farmers. It is reported that the pre-existing seed production scheme has totally crashed since the liberalisation process (Nigeria) was implemented. When pre-existing scheme have been transferred to private companies (as in the case of Lonrho Zambia), there have been complaints about seed prices and quality.

Most private companies, although not all, do not provide any technical assistance to cotton growers. In Nigeria, extension work seems to have totally stopped. In Ghana, extension is often limited to the implementation of mechanical ploughing that farmers request. In Zambia, the private company belonging to Lonrho has set up its own extension staff, while another big private trader seems to ignore such needs.

In the prevailing circumstances of no technical information or input provision through adapted credit, we doubt that yield (land productivity) has ever increased after privatisation began. Productivity remains, at best, unchanged, if individual cotton acreage per labour has not been increased.

4.1.4. Future gain in productivity is not under preparation

Research implementation is assumed, along with the efficient provision of other services, to provide a new margin for productivity gain. Continuation of this implementation, the extent of research activities in connection with allocated funds, are indicators of productivity gain prospects. In this sense, the situation is very alarming in all the English-speaking SSA countries. It is not an exaggeration to state that there is no longer any research implementation in Nigeria since shortly after privatisation took place, as no financing mechanism has been

provided. One sign of this worrisome situation can be seen in the total collapse of the seed production system¹³. The same situation prevails in Tanzania. In Ghana and the Zambia, the research system is practically inactive as a consequence of short financing. In Zimbabwe, research has been resumed in some activities thanks to an externally financed project; the same applies to Mozambique owing to a French-supported project. Recently, Ghana has been targeting establishing a new relationship with CIRAD in order to relaunch its research activities. Zambia is expecting a similar relaunch through a new project to be financed by France.

On the contrary, research on cotton-based cropping systems has remained active in most French-speaking SSA countries. One acknowledged positive output relates to high ginning outturn (percentage of fibre out of seedcotton) which directly induces cost reduction in cotton lint production. This output began in Côte d'Ivoire in the mid-1980s and has now been diffused to all of the French-speaking SSA countries whose average outturn is over 42% against 35-38% in most non-francophone countries in the continent.. Another positive impact is related to pest management whose cost has been reduced with equal if not better efficiency. In this area, some French-speaking SSA countries are meeting the challenge of having illiterate farmers cope with pest control adjusted to pest pressure levels, a 50% of reduction in pesticide use is being experienced with unchanged pest control efficiency¹⁴. There are, however, still many challenges ahead. Yield stagnation is harming cotton farmers' income, some pest resistance has occurred, phenomena for which we will not elaborate the underlying factors here. At the same time, adequate research financing is far from being clearly identified. Benin is puzzled by the privatisation process which offsets the existing research financing mechanisms controlled by the state-owned SONAPRA. In Mali, although privatisation has not taken place with the cotton company which contributes a lot in research financing, there are signs that a funding shortfall is responsible for a reduction in research activity.

4.2. Regarding poverty alleviation

4.2.1. Price improvement that requires cautious interpretation

Privatisation has led to a price increase in favour of the cotton growers, at least in the short run. Evidence is provided in the case of Nigeria, but in nominal price and in the local currency, which was severely devaluated along with privatisation; whether farmers have actually become better off remains questionable.

¹³ Chikwendu, D. O. and Giwa, R. I. (1994). Marketing of cotton in a deregulated economy: the Nigerian experience. , pp. 21.

¹⁴ Silvie, P., et al., 1998. Procedures, advantages and constraints of Staggered Targeted Control programmes on cotton in West Africa. Communication presented to '2nd World Cotton Research Conference', Athens, 4 p.

Table 4 : Nominal price increase in liberalized cotton countries

	Nigeria	South Africa	Zimbabwe
Product paid	seedcotton	lint	seedcotton
Currency	Neira	SA Rand	Zimb \$
1977	0,330		
1978	0,330		
1979	0,330		
1980	0,330		
1981	0,400		
1982	0,465		
1983	0,510		
1984	0,560		0,555
1985	0,700		0,655
1986	0,850	2,900	0,735
1987	1,200	2,950	0,735
1988	2,750	2,800	0,785
1989	3,500	3,500	0,860
1990	4,000	3,550	1,100
1991	5,000	4,720	1,350
1992	5,000	4,720	2,950
1993		4,800	2,950
1994		4,900	4,000
1995		5,120	6,000
1996		6,350	5,700
1997		7,400	5,600

Source : Chilwendu and Giwa ; Republic South Africa, 1997 ; Republic of Zimbabwe, 1997

Referring to the indicator of the ratio comparing purchase price to the world market cotton lint price (but corrected in order to fit with the purchase of seedcotton) is more neutral towards the macroeconomic incidences. In this sense, The World Bank has observed a significant improvement of this ratio in favour of the cotton growers in Zimbabwe¹⁵. This is a fundamental argument this institution uses to highlight the unfair situation in French-speaking SSA countries where this ratio seems to be far smaller.

No similar information is indicated for Uganda which the World Bank also praises for its success in privatisation. No details are given on the way of calculating the above-mentioned ratio¹⁶.

In Ghana, a price increase has been observed as well, but its positive impact on farmers' income is doubtful as input prices have increased even more. It is important to underline that, in spite of the liberalisation of the cotton sector, price competition is no longer observed in this country. There is a clear "co-ordination" between the cotton companies in collectively fixing a common price to prevent farmers from selling their production to companies other than those from whom they have received soil preparation and chemical products. As an associated effect of this "price co-ordination", input credit pay back is included in the price fixing. This type of arrangement prevents difficulties in credit reimbursement as experienced earlier, shortly after liberalisation. However, an essential consequence of this mechanism is to

¹⁵ This ratio is estimated at 80% in Zimbabwe and 40-50% in francophone countries (Pursell-Diop, 1998)

¹⁶ Such details are essential as the calculation of the ratio is a difficult one owing to the fact that there an uncertain delay between the period of seedcotton purchase and the period of fibre selling in the fluctuating international market, the choice of the selling period induces the choice of the international price to retain.

totally transfer the increase of input costs to the cotton growers. The case of Ghana clearly demonstrates that liberalisation does not lead automatically to price competition in favour of the cotton producers, as was assumed by the World Bank.

Table 5 : Evolution of input and output prices in Ghana

	1985/86	1986/87	1991/92	1996/97
Fertilier cost (c/unit)	1175	2050	12900	77000
Pesticide cost (c/unit)	2120	3600	24300	67200
Seedcotton price (c/kg)	25	28	70	220

Source : Poulton, 1999

4.2.2. Adjusted insight from going beyond the price level

.1. *Differentiated price incentive owing to liquidity constraint*

The price level is also a short indicator of its actual incentive effect. Delay in payment of the price promised is an essential factor in the cotton growers' income expectations. Under liquidity constraint, as is the case for most smallholders in developing countries, cotton growers might prefer accepting a lower price but with immediate payment instead of a higher price whose payment could be very much delayed. In Tanzania, it seems that there is still some actual price competition among the ginneries (more than 50 ginneries were listed in this country in 1998), the price levels also vary throughout the period following the harvest. However, payment delay can be very long, so that it is hard to conclude, for an individual farmer, whether the price he finally gets corresponds to the highest prices observed in rural markets. Furthermore, there is evidence that supply response to price occurs mainly among farmers who are better off, thus, we can fear that liberalisation has led to differentiated effects at the expense of those worst off.

.2. *Better indication from income instead of price alone*

Basing the impact assessment only on price is debatable. There is research which questions the extent of the supply response to price. In Uganda, no evidence is provided to corroborate such response¹⁷. For other countries, supply elasticity to price has been found to be very variable between countries.

More fundamentally, it is also claimed that farmers produce according to their income expectations for which price is only one among many factors. Comparison of incomes on the basis of surface unit shows that farmers of Zimbabwe are not in so much better a situation than those of Côte d'Ivoire in spite of the far more favourable price ratio the World Bank has calculated¹⁸. This is the result of taking into account yield levels that favourable input provision conditions and actual technical information provision help to reach.

¹⁷ Opira Otto, 1997. Farmers' behaviour to changes in producer prices. Sveriges Lantbruks Universitet, Uppsala, 39 p.

¹⁸ Freud, C., 1999. Politiques des prix et performances des filières cotonnières en Afrique. Revue Tiers Monde XL, 160, pp. 929-941.

Table 6 : Higher income in spite of lower price in Côte d'Ivoire compared to Zimbabwe

	Côte d'Ivoire		Zimbabwe	
	1993	1996	1993	1996
Gross purchase price, seedcotton (FF/kg)	1,80	1,85	2,70	2,75
Cost of chemicals per kg of seedcotton	1,05	0,72	0,78	0,78
Gross margin per kg seedcotton	0,75	1,13	1,92	1,97
seed cost			0,09	0,09
Transportation cost to buying centres			0,03	0,03
Net margin per kg seedcotton	0,75	1,13	1,80	1,85
Subsidy to chemicals	0,30			
Net purchase price, seedcotton	2,10	1,85	2,58	2,63
seedcotton yield, kg/ha	1168	1200	600	600
Gross income	2453	2220	1548	1578
Added value	876	1356	1080	1110

Source : C. Freud, 1999

The possible incentive of income is sustained by some facts derived from surveys implemented in Mali¹⁹. On the basis of net income per hectare (only after deduction of input costs under a low capital production scheme), cotton ranks among the most attractive crops (rice gives better results, but can only be cultivated in limited areas and not in every village). However, cotton is far more favourable on the basis of the farm unit as secured marketing pushes farmers to grow more cotton without any constraints in soil adaptation.

4.2.3. Scarce indicators of improved welfare related to privatisation

We have no knowledge of direct and specific studies analysing the social impacts of cotton sector privatisation in non-French-speaking SSA countries. Existing studies do not show any improvement, whereas we have underlined some concern for farmers in the worst situations.

In spite of plentiful statistic data in French-speaking SSA countries, there is little attention paid to social indicators to assess improvements in farmers' welfare. The very positive development of ox-drawn agriculture in Mali, figures about the very significant cattle increase (a means of capitalisation in many SSA countries) in Mali and also in other countries, nevertheless, to a lower extent, are indicators that cotton production in non-privatised or non-liberalised countries may lead to some positive developments²⁰. However, obvious material equipment accumulation is visible in many cotton areas in these countries as opposed to non-growing ones. In Mali, many farmers are travelling on motorcycles whilst during the 1980s, entry level extensionists were only equipped with bicycles: it was a matter of debate within the cotton company to analyse whether such a differentiation was acceptable for a fair relationship between farmers and extensionists (meanwhile, extensionists have been provided with upgraded transportation equipment).

¹⁹ Fok, A. C. M., et al., 1999. Diversité des pratiques paysannes en zones cotonnières du Mali : portée et limites des gestions d'itinéraires techniques observées. Communication presented to Conference 'Rôle et place de la recherche pour le développement des filières cotonnières en évolution en Afrique', Montpellier, Sept. 1-2, 1999, 137-159 p.

²⁰ CMDT, 1991. L'extension des superficies : processus et causes. CMDT, Bamako (Mali), 21 p.

CMDT, 1991. Revenus monétaires nets des producteurs du coton (campagne 1990/91).

CMDT, 1992. Impact de l'équipement sur l'organisation du travail au sein de l'exploitation. ,

The impact of cotton production on food security is also better documented in French-speaking SSA countries. There is evidence that food security is better ensured by cotton growers as opposed to non-growing ones²¹. In spite of producing cotton, cotton growers are producing at least as much food as non-cotton growers. However, as non-cotton growers have to sell part of their food to meet their cash needs, actual food availability for their own consumption is far lower than cotton-growers whose cotton production provides them secure cash.

Table 7 : Food surplus in cotton zone in 1992

<i>Farm type</i>	<i>Cotton growing</i>	<i>Non-cotton growing</i>
Advanced ox-draught equipped farms	170	122
Ox-draught equipped farms	156	244
Farms with no or little ox-draught equiped farms	25	67
Average	150	130

Source : CMDT, 1992

Table 8 : Food surplus in cotton zone in 1998

<i>Farm type</i>	<i>Cotton growing</i>	<i>Non-cotton growing</i>
Advanced ox-draught equipped farms	239	334
Ox-draught equipped farms	230	302
Partially ox-draught equiped farms	51	18
Manual farms	32	-12

Source : M. Fok et al, 1999

Such results are being confirmed in Northern Mozambique where cotton production resumed less than a decade ago. Our current surveys show that half of the surveyed farmers are now equipped with radios and bicycles, whereas 64% and 75% of non-cotton growers have respectively no bikes or radios, compared to 40% and 45% of the cotton growers. In Mozambique, it is noteworthy to recall that cotton development has thus far been engaged in a privatisation scheme without liberalisation.

4.3. Regarding sustainability

The issue of sustainability is a complicated one, we refer here to only two of its components: environmental sustainability and the duration of the private operators' involvement.

4.3.1. Preservation of soil resource being further questioned

In developed countries, concern related to chemical fertiliser use is associated with their overuse leading to water pollution; the issue is totally reversed in SSA countries where the average use is estimated at around 5 kg/ha of fertilising elements. This level is far from being sufficient to compensate crop mineral exportations, leading to real soil mining that pushes farmers to abandon cropped lands in favour of new lands at the expense of natural forestry. Wherever the strategy of low input/low output has been followed, chemical fertilisers brought to cotton have had little positive incidence to correct the generally negative situation. In French-speaking SSA countries, we observed that cotton cultivation contributed to increasing

²¹ Raymond, G. and Fok, M., 1994. Relations entre coton et vivriers en Afrique de l'Ouest et du Centre : Le coton affame les populations ? une fausse affirmation. Economies et sociétés Série Développement agro-alimentaire 22, 3-4/1995, pp. 221-234.

chemical fertiliser use, leading to a better mineral input/output balance of the cotton-based systems, although not sufficient to ensure the desired equilibrium²².

Privatisation or liberalisation has undoubtedly led to making the pre-existing negative situation even worse. This is clearly assessed in English-speaking countries where the use of chemical fertilisers has decreased. Soil mining is being accentuated.

The situation seems to be less alarming in French-speaking SSA countries, where input subsidies have been phased out during the last decade. The increase in fertiliser prices has been relatively offset by seedcotton price improvement, in particular after the CFA devaluation. Although it remains common to observe that farmers are not using fertilisers at the recommended dosages, such use remains very significant and our recent surveys show that farmers in Mali are using fertilisers predominantly on cotton (but also on maize to a lesser extent), and that they are using them rationally in accordance with yield expectations. It also appears that farmers are moving towards higher production and use of cattle manure as a response to fertiliser costs, whilst organic fertilising is more commendable than mineral fertilising as far as soil preservation is concerned.

4.3.2. Harm to environment limited by reduced use of pesticides

Privatisation also impacts on reduced use of pesticides for pest control. This is not a result of greater concern about the dangers of pesticides, but of reduced availability of the needed pesticides. In Ghana, most farmers are not applying pesticides more than twice and there are significant numbers of farmers who are no longer applying any at all. This is a positive result in terms of reduced risk to the environment or public health. The issue is that yield expectation is seriously decreased as no alternative and efficient pest control is available or implemented. Overall, in SSA countries where farmers are far from overusing pesticides, the global impact of reduced pesticide use must be considered as a negative one.

In French-speaking SSA countries, privatisation of input provision has been actually institutionalised in Benin, but in Mali and in other countries, it is hard to say that there is still a monopolistic situation of chemical provision as one can now find such products in rural markets without any control. There have been claims made against the questionable quality of pesticides provided in Benin since privatisation, similar claims are also encountered in other countries. It is hard to state that this is a real issue as, at the same time, it has been scientifically observed that some insects have become less susceptible if not resistant to some pesticides in these countries. Extension of pesticide use, either on cotton which is more widely grown, or on other crops (vegetables during the dry season, for instance) makes it necessary to adapt pest control. Some initiatives are underway, through a regional network composed of several French-speaking SSA countries, to cope with the issue of pest resistance, but more still needs to be done.

4.3.3. Unstable private operators' involvement

Lastly, privatisation requires that the private operators remain in the cotton business for a certain time, but this has not been totally ensured, either in the case of national or international private operators.

²² Van der Pol, F., 1990. Soil mining as a source of farmers' income in Southern Mali (L'épuisement des terres, une source de revenus pour les paysans au Mali-Sud). Communication presented to Conference 'Rencontres internationales "Savanes d'Afrique, terres fertiles ?"', Montpellier, 10-14 décembre 1990, 403-418 p.

In Ghana, there was a significant number of competing private operators attracted by the cotton business. Fourteen were in operation in 1995, but only 12 remained in 1996 as companies collecting only small amounts of seedcotton were forced out of business. In Benin, some of the newly established ginneries are under the threat of being put out of business owing to the recent international cotton price crisis. There is an issue of imbalance between the increased ginning capacity in the country and the production level, some ginneries are then forced into investment underuse.

The situation is not better for international investors. Lonrho's commitment to the cotton business dates from 1986, starting in Zambia. It then extended its activities to South Africa, Mozambique, and had prospects in Uganda before deciding to withdraw totally from the cotton business in 1999. In Zambia, Lonrho has been replaced by Dunavant, a world leader in cotton fibre trade but a newcomer to cotton production in Africa. Who will replace Lonrho in Mozambique remains unknown and there is the threat that the positive production trend will not continue in the Northern province of this country.

In Côte d'Ivoire, some international investors have also shown questionable attitudes during the recent cotton crisis (with the world price down to US \$0.44 in February 2000). One private company has decided to postpone the selling of its cotton lint expecting the market to turn around. As the crisis lasted longer than expected, the company faced serious cash flow difficulties that it solved by delaying payment to cotton growers: it has been reported that to date there are still farmers who have not been paid for the cotton they sold more than six months ago.

There is need for research to assess the profitability of private cotton companies. The exit of private operators we are reporting underlines that this profitability is not automatic; unstable involvement of private operators could impede farmers' affiliation to cotton production.

5. The issues to address

5.1. Questionable results from privatisation

There is no way to claim that cotton sector privatisation has reached full success everywhere. In related countries, cotton production has not been increased to the extent implicitly expected, and certainly not on the larger scale that countries with little privatisation in French-speaking SSA have attained.

For the farmers, prices may have reached higher levels but this is a poor if not a wrong indicator of the progression of their income, at least for the worst off among them.

For the private operators, at least for those who have to decide whether to leave the cotton business, privatisation has left a bitter taste. This is true for both national investors and for powerful international operators.

From the point of view of collective concern, for instance, sustainable management of natural resources, the soil mining process has been accentuated by the reduced use of chemical fertilisers which was already alarmingly low.

One could wonder how realistic it may be to expect that privatisation, understood as a mere transfer of property rights from a public organisation to private firms could help reach so many implicit goals in the areas of poverty alleviation, international competitiveness and

sustainability²³. To be accurate, those goals are more attached now to liberalisation of an economic sector than privatisation of firms, this latter could be an element of the former. This observation complies with the World Bank's current position stating that privatisation is no longer the issue, but liberalisation is. The results we have analysed are those of a variable combination of privatisation and liberalisation. Our analysis leads us to realise that the privatisation/liberalisation which has been conducted so far does not yield the expected results. This statement is not a dismissal of the principle of privatisation/liberalisation but rather an emphasis on the attention to that must be paid to the means of implementing this principle.

5.2. Liberalisation must be prepared

There is more agreement on the need to prepare the move towards liberalisation. The World Bank believes that a free-market would be beneficial to farmers but acknowledges that privatisation alone would not induce free-market functioning. This institution suggests the implementation of a transitional period to prepare free-market functioning. It has also become conscious, although still timidly, that there are activities which belong to public goods and which can hardly be privately financed. However, little attention has been paid by the World Bank to market failures that increase transaction costs. This is probably because all the privatisation and liberalisation processes have started by focusing on governments failures which were thought to be the root of all evil.

There is an urgent task for academics to cope with the identification of services that cannot be privatised as well as market failures that need to be corrected. A network approach would be efficient as it would reveal more easily failures from a set of variable situations in cotton production and processing in different countries.

5.3. Questionable evolution from non-privatised cotton sectors

Insufficient results in enhanced privatisation/liberalisation countries should not lead to showering fulsome praise on the cotton sector systems at work in French-speaking SSA countries. Yield stagnation has been observed there for years. Pest management limitations have been pointed out. Sector co-ordination is facing serious turmoil: the latest being the Malian farmers' protest against the seedcotton price that pushed them into a strike against sowing cotton²⁴ and whose result will be an estimated 50% decline in production for Mali this year.

There are serious technical and institutional challenges ahead; if coped with successfully, they could provide new room for progress. How to achieve this still needs to be figured out. The World Bank does not believe that such desired development is feasible under current cotton sector organisation; this is the rationale for its preference for the more radical move towards liberalisation they advocate. The very serious management malpractice which has recently been revealed in Mali seems to make it appear that the pessimists were correct. This is the

²³ Bouin, O., 1992. La privatisation dans les pays en développement : réflexions sur une panacée. OCDE, Paris, 35 p.

Vernon-Wortzel, H. and Wortzel, L. H., 1989. Privatization: Not the only answer. World Development 17, 5, pp. 633-641.

²⁴

most serious crisis that has ever been faced so far in Mali; it could herald a coming cotton collapse in this country or it could prepare a new move ahead, as no progress is possible without crisis²⁵. It is up to the populations of the concerned countries to show in the future whether the World Bank has been right or wrong.

Exchange of information between countries facing similar issues could be an useful tool to help each country find its own way. Co-ordination of information collection and diffusion in favour of all the cotton sector stakeholders should help the process of exchange and negotiation between cotton players: we believe that sharing of information references is a pre-requisite to having people agree on shared issues before trying to solve them.

5.4. Stop being amnesiac and short-sighted

One topic that deserves to be shared relates to information about previous debates and processes regarding the privatisation/liberalisation of seedcotton trade *versus* the monopoly systems in Africa. Few experts, if any, engaged nowadays in cotton sector development are aware that such debates persisted from the mid-nineteenth century to the mid-twentieth century, nor are they aware that there were experiments in free-market systems moving towards monopoly and inversely²⁶. Few academic works, if any, have dealt with an analysis of these experiences and try to extract lessons that could help guide current institutional change in cotton sectors. This amnesia should no longer prevail. Promotion of cotton production in Africa was started everywhere through the deep involvement of private traders. The government role of regulation and involvement in the cotton sectors has resulted from the failure of the private traders' efforts. A basic issue is to clarify what were the conditions that were missing and led to the free-market not functioning. A collateral issue is to check how such missing conditions have evolved in the meanwhile to fit in with successful functioning of privatisation/liberalisation.

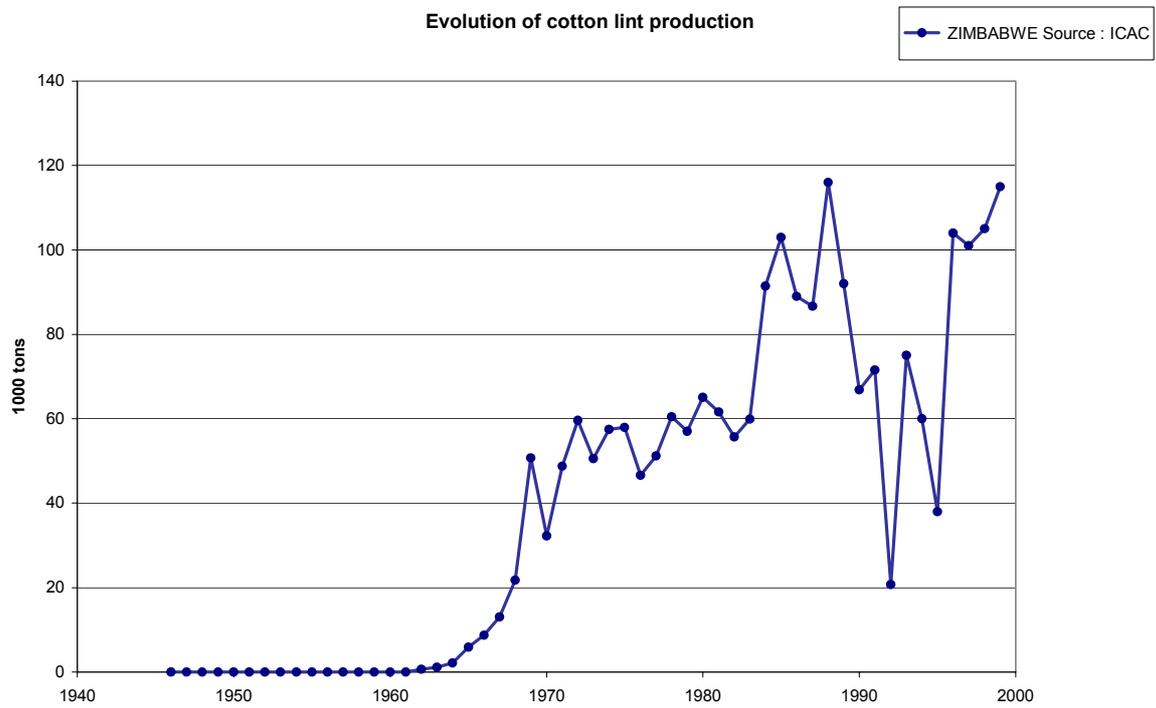
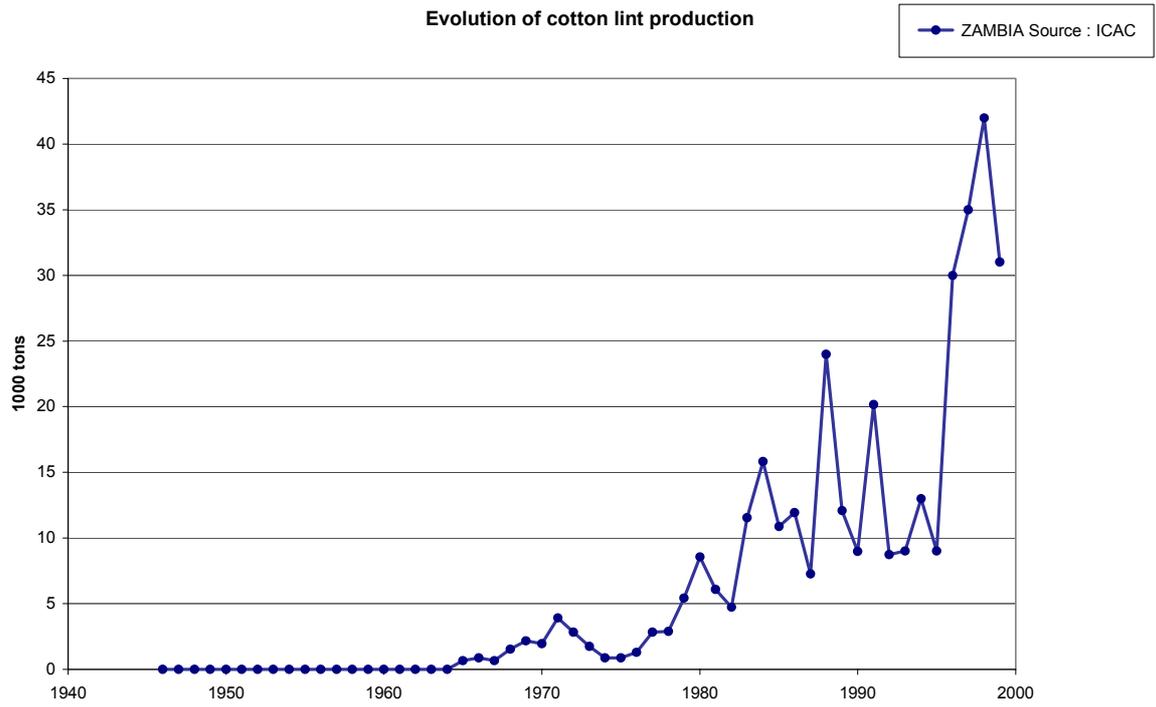
In short, as a contribution to making privatisation/liberalisation more successful, a prerequisite analysis of market failures and public goods should be implemented covering several countries through a dynamic, historically-based network.

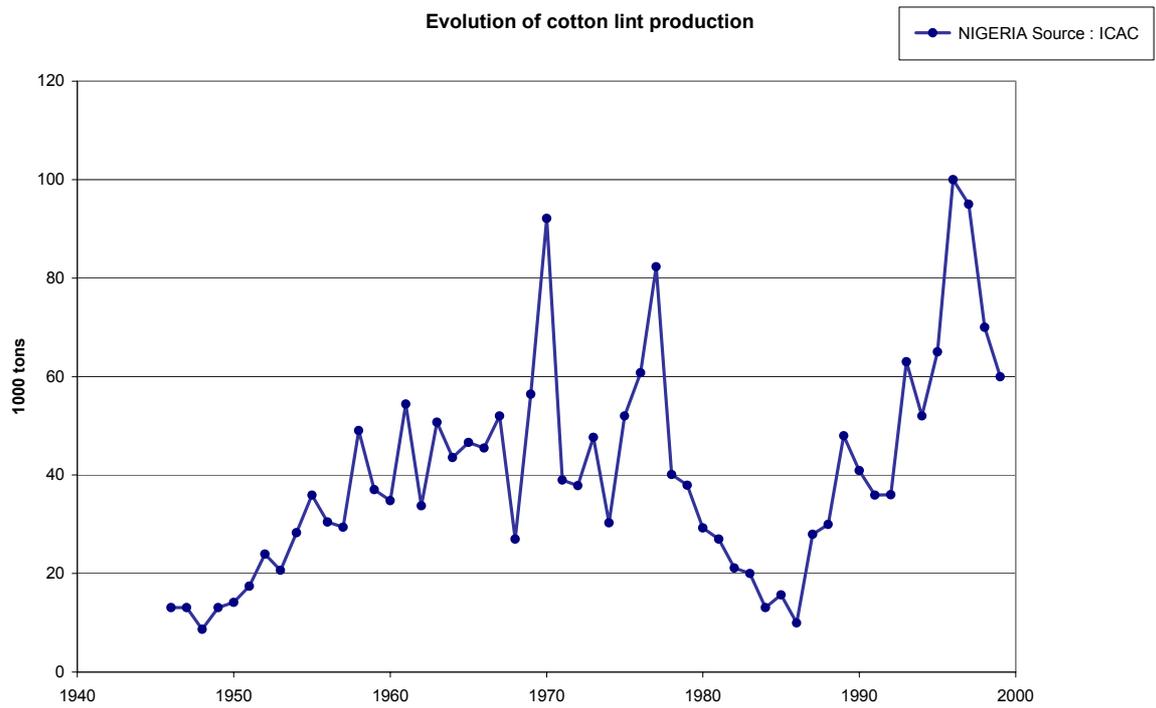
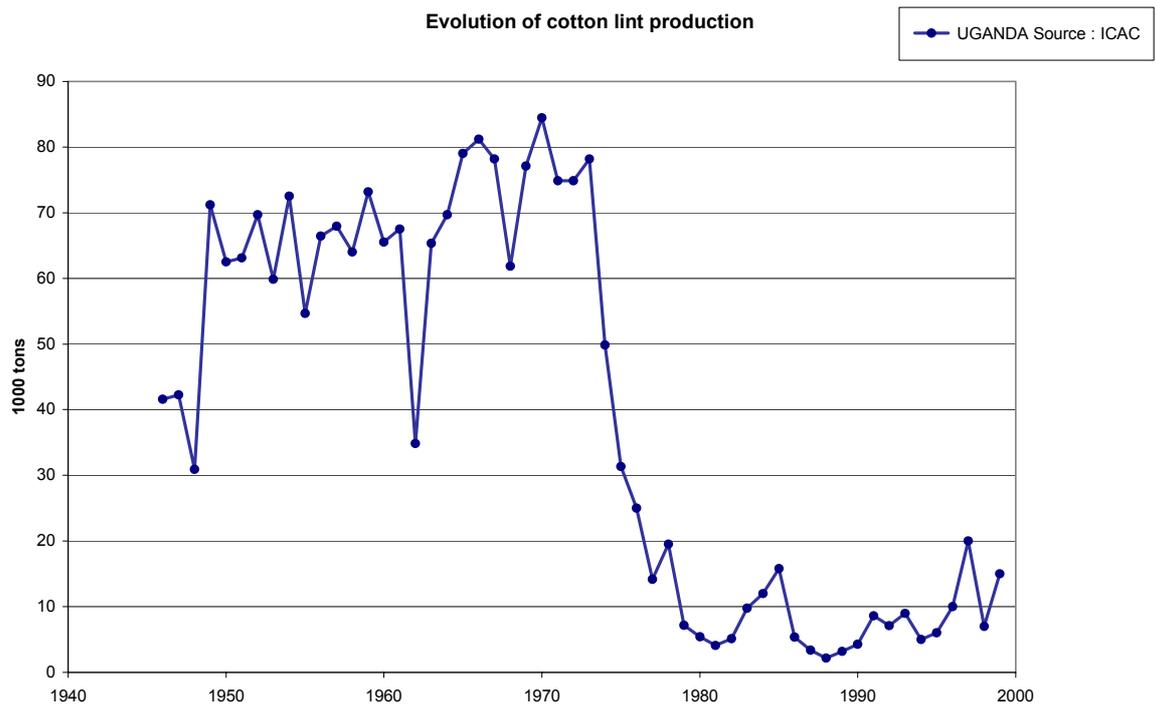
²⁵ Fok, A. C. M. (1993). "Le développement du coton au Mali par analyse des contradictions : Les acteurs et les crises de 1895 à 1993," CIRAD, Montpellier. 237 p

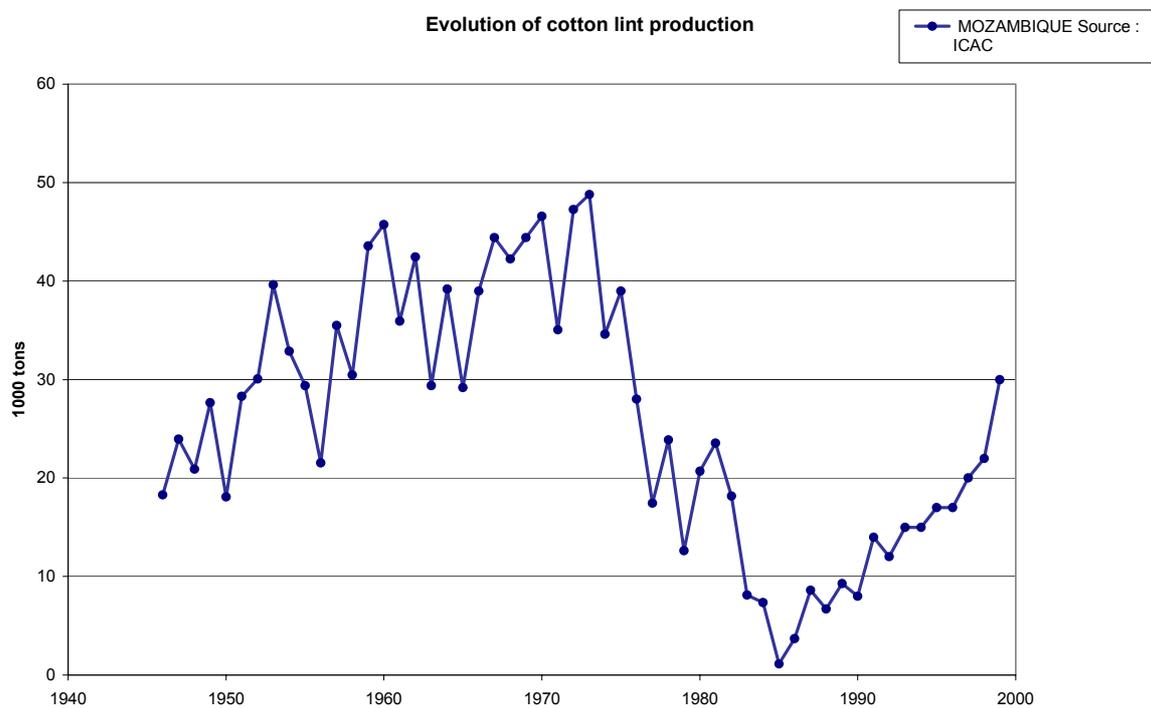
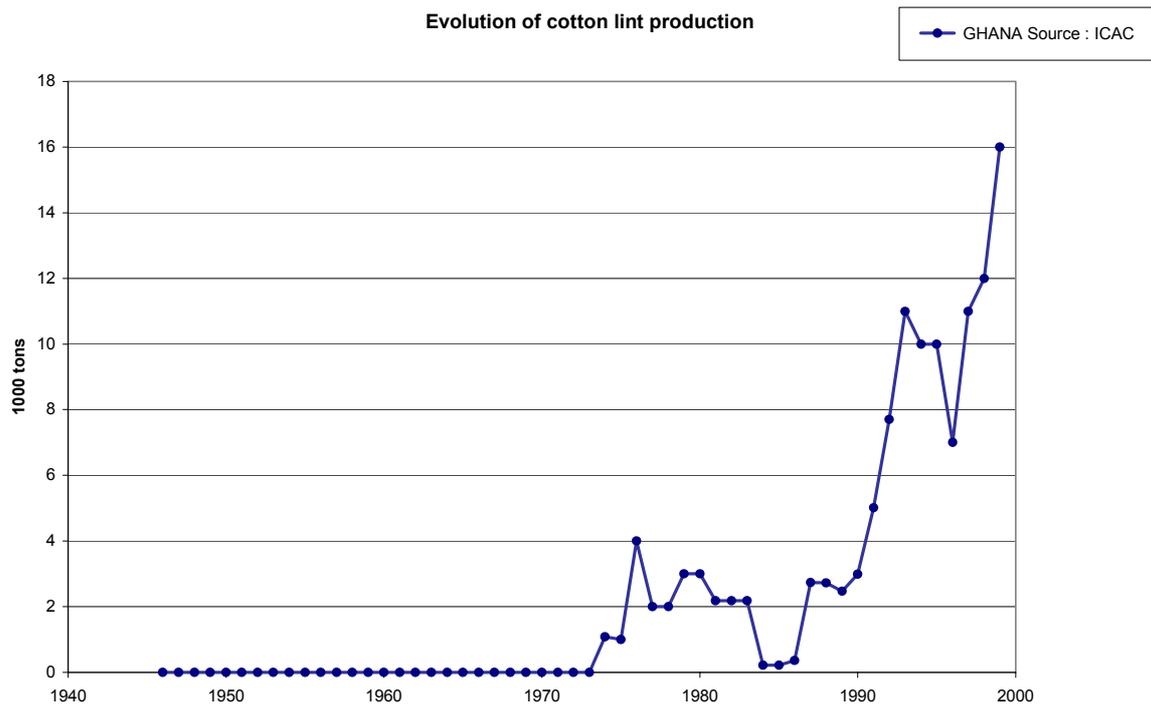
²⁶ Fok, A. C. M., 1999. Organisational perspective of the cotton production in Sub-Saharan countries : a still lasting history of mutual influence. Communication presented to Conference 'African studies Association of Australasia & the Pacific International Conference "New African Perspectives"', Perth, Australia, Nov. 1999. 24 p.

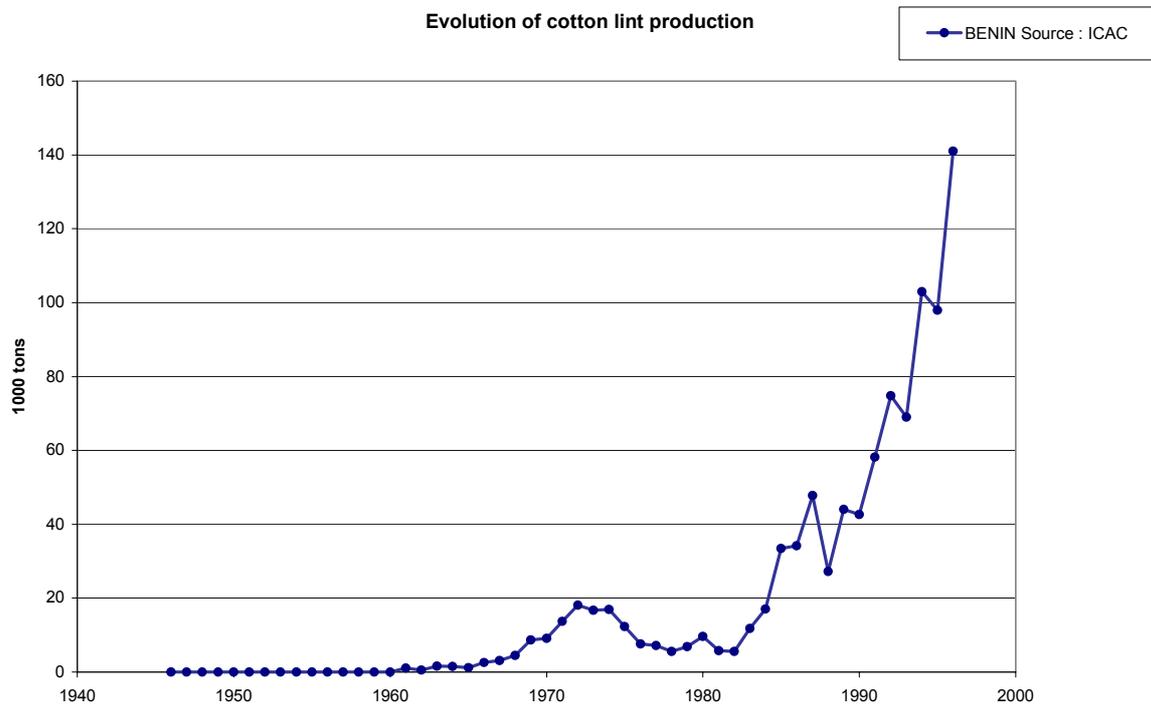
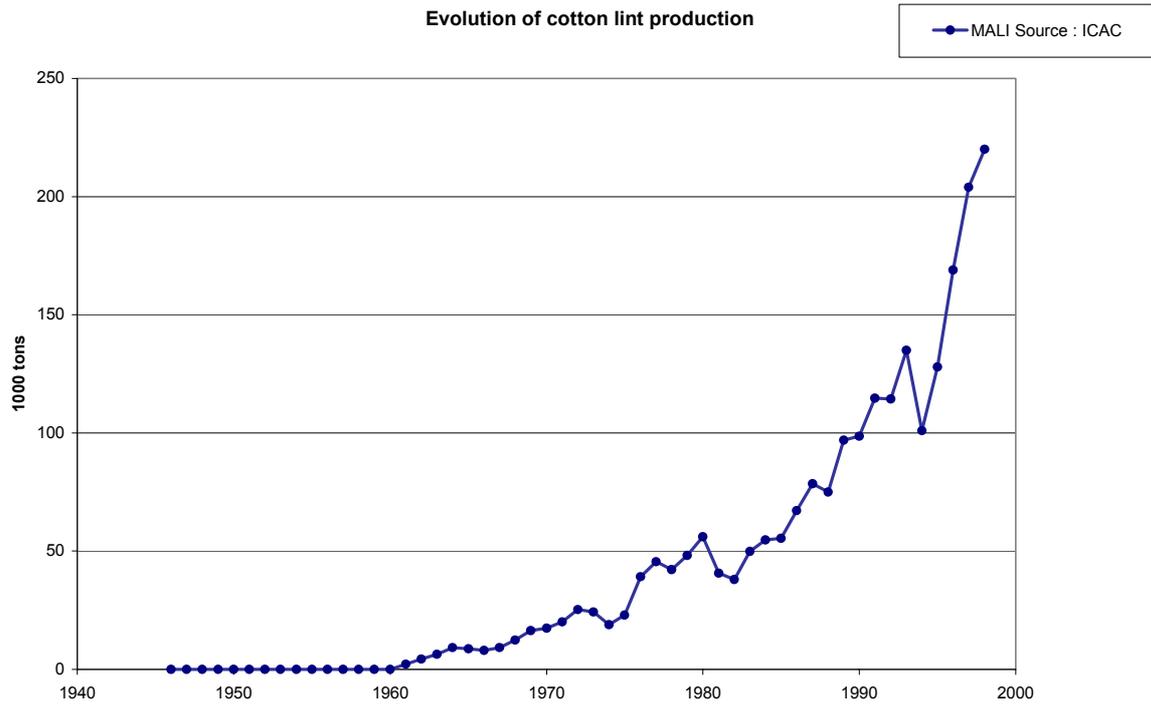
Diagram 1: Various "technical steps" in the cotton sector

Process	State of products	means of processing,	Natural factors
Transport	Fertilisers + pesticides "at portside"		
	↓		
	Fertilisers + pesticides at warehouse	Rail, road, truck	
Transport	↓		
	Seed + fertiliser + pesticides delivered field edge	Road, truck	
Crop parasites,	↓		Stress :
	Seed cotton climate, water	Oxen, tools and agricultural machines,	soil,
	Field edge	rural tracks	
Transport	↓		
	Seed cotton on the farm T1		
Storage	↓		
	Seed cotton on the farm T2		
Transport	↓	Road, truck	
	Seed cotton at collection point		
Transport	↓	Road, truck	
	Seed cotton at factory at time T'1		
Storage	↓	Hangar	
	Seed cotton at factory at time T'2		
Ginning	↓	Ginnery, power	
	Cotton at factory T''1		
Storage	↓	Hangar	
	Cotton fibre at factory T''2		
Grading, Classification	↓	Equipment (HVI)	
	Cotton fibre classified T'''1		
Storage	↓	Hangar	
	Cotton fibre classified T'''2		
Transport	↓	Road, truck	
	Cotton fibre classified at export port T''''1		
Storage	↓	Hangar	
	Cotton fibre classified at export port		









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