

## Preface

The International Institute for Environment and Development (IIED), ProForest and Rabobank International were commissioned by the International Finance Corporation (IFC)'s Corporate Citizenship Facility and WWF-US to research the environmental and social issues associated with the production of a wide range of agribusiness commodities. The project aimed to understand how useful the development and application of 'Better Management Practices' (BMPs) would be for these commodities. Specifically, the project has sought to provide guidance on:

- the commodities future initiatives should focus on;
- the potential partners for these initiatives; and
- the key opportunities and constraints associated with each commodity.

The first phase consisted of a scoping review, which involved the collection of basic data and industry intelligence on each of ten commodities (cocoa, coffee, cotton, oil palm, salmon, shrimp, soy, sugar, tea and timber pulp). At the end of the first phase, IFC and WWF-US selected four commodities (cotton, palm oil, soy and sugar) for further investigation, on account of the perceived magnitude of sustainability impacts, financial sector traction, and the potential added value of an IFC/WWF initiative for each commodity.

This report is the product of the second phase of the project and is intended as a basis for discussion regarding future work on BMPs and agribusiness commodities. For each of the four selected commodities, it sets out background information on the sector; key environmental and social impacts; prospects for tackling these impacts through the adoption of BMPs; and preconditions, risks and strategic choices in relation to developing a BMP approach. The four commodity-specific chapters are preceded by a summary of common themes and potential approaches that emerge.

The research focused particularly on production issues (rather than processing, trading or retail). Processing issues were addressed where they are integrated with primary production (e.g. carried out at the same location as production). However, where non-production issues have significant implications in terms of the potential for BMPs, the research also highlights these.

This report was written by IIED and ProForest in co-operation with Rabobank. Readers should note that the report is intended as a rapid, 'first-pass' assessment of these commodities, and, given the evolving nature of commodity production and trade, elements of the report may be inaccurate or out of date. Furthermore, it should be emphasized that Rabobank provided input for this publication and was not involved in the final editing or writing of the report. As such the report does not necessarily represent the views of Rabobank in all areas.

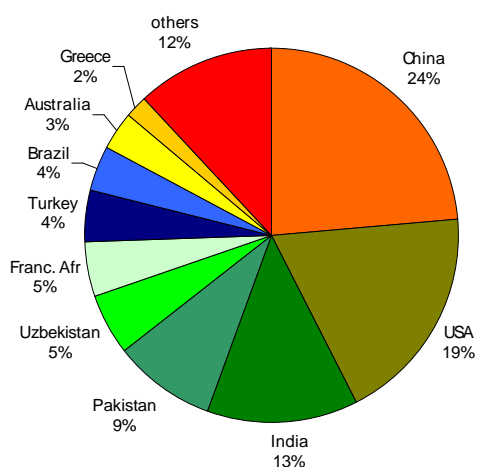
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### 2.1 The cotton sector

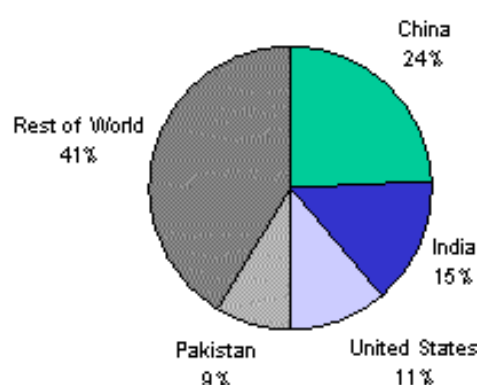
#### 2.1.1 Production volumes and regions

Cotton is produced in approximately 90 countries worldwide, approximately 80% of which are classified as developing nations, with 30-35% of primary production traded internationally each year. The United States and China are the single biggest producers of cotton, while India, Pakistan, Uzbekistan and the West African region are also large producers (figure 2.1). While many developing countries are involved in cotton production, these six major producing nations account for 75% of total supply.

**Figure 2.1 Distribution of world cotton production (average 1998-2003)<sup>8</sup>**

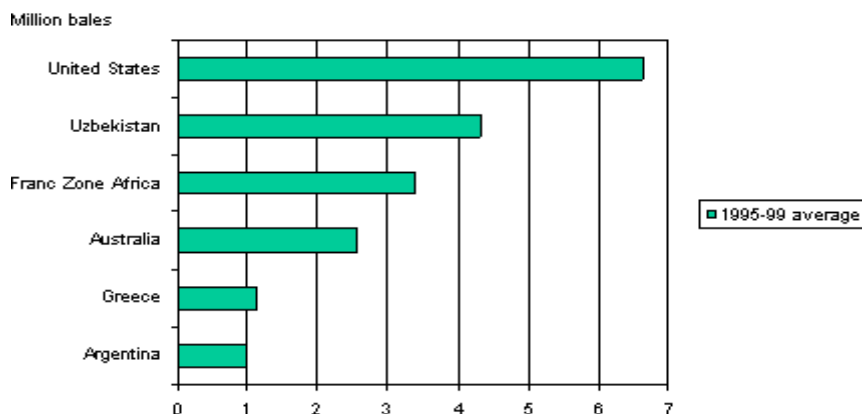


**Figure 2.2: World cotton apparent consumption**



Source: Foreign Agricultural Service, USDA

**Figure 2.3 Leading cotton exporters**



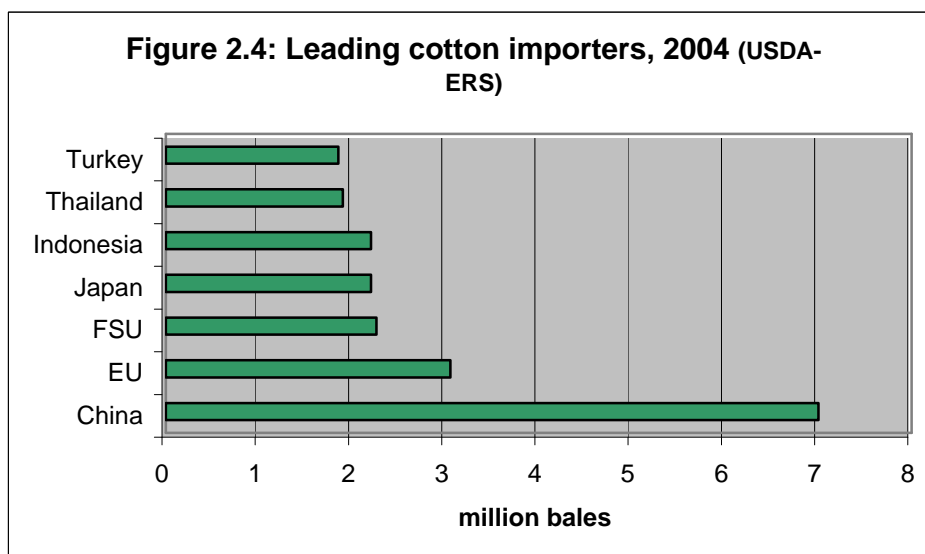
Source: Foreign Agricultural Service, USDA

Australia and the collective group of West African countries (Franc Zone Africa) are more important to the cotton complex in export supply, and the US role in export markets has increased steadily in the past five years as the local textile sector continues to contract. Leading export suppliers include the US, Uzbekistan, West Africa and Australia, which account for over two-thirds of total export supply (Figure 2.3). Noticeably only the US as a major producer is also a major exporter, reinforcing the local market apparent consumption of the big producers. The US has been able to successfully expand its exports with the use of the GSM-102 programme, whereby up to 3 years credit is provided to countries that buy

<sup>8</sup> Source: ICAC, 2004.

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US cotton. Turkey is a major buyer of US cotton via this programme. Market access is also preferential through NAFTA into Mexico, which has also experienced a huge expansion of its textile sector. Other trade flows are concentrated regionally, for example Turkmenistan into Turkey/Pakistan. The biggest importer of cotton is now China, which is taking an increasing role in the textile sector (Figure 2.4).



### 2.1.2 The value chain

The simplified value chain for cotton is presented in Figure 2.5, but this is only indicative. The value chain differs markedly between countries and in some cases, e.g. China and Uzbekistan, there is a high degree of government involvement in chain activities. This has usually reflected the degree of economic development within the host country; the USA and Australia have effectively no government ownership of assets in the value chain.

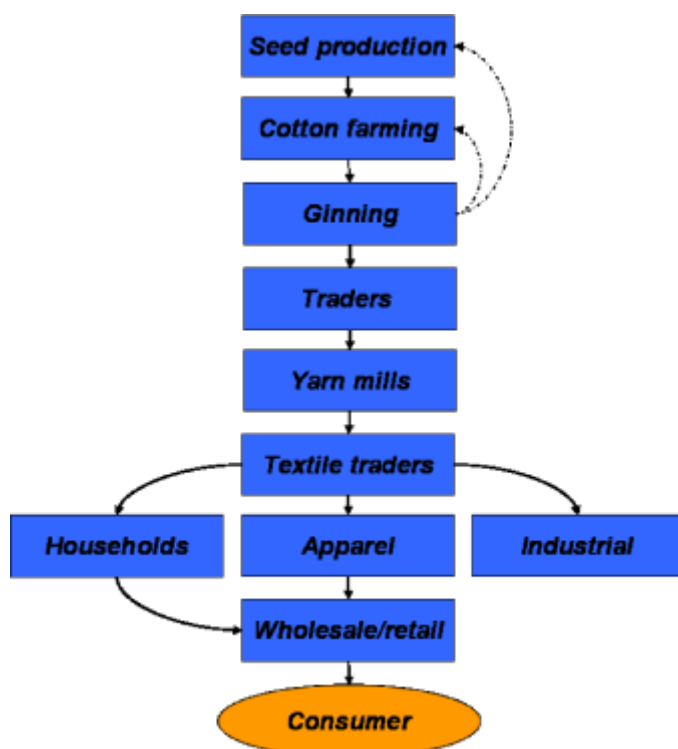
**Seeds and farm production** are undertaken by specialist producers, usually on contract to seed companies. Production is usually in isolation of any other cotton to ensure product integrity. Not all cottonseed companies are global but they will usually have some sales representation (at least) in all major markets. Cotton is one of the few commercially approved GM crops being grown worldwide, with approximately 20% of global cotton produced using GM seed. About 34% of world's exports are of GM varieties. In the US, GM cotton varieties cover almost 75% of the cotton area. Cotton is an annual crop replanted each year and is a member of the hibiscus family. 34 million hectares of cotton were planted in 2002/03, with approximately 45% irrigated and 55% based on rain dependent systems. Farm size varies widely given cotton's production in developing and developed markets. In Africa farms can be as small as 0.5ha per farm, whereas in Australia farm sizes have reached over 15,000ha irrigated production. In some cases operations are integrated with ginning and marketing but usually the operations are split between production then processing. Income is usually largest from lint sales versus seed sales; in developed markets the ratio can be as high as 80(lint income):20(seed income)

**Ginning and marketing:** the largest ginners are commonly the largest marketers (i.e. Dunavant, Louis Dreyfus, Ecom, Cargill, Queensland Cotton). Cotton lint is sawn or rolled away from the seed using high speed ginning equipment. The process will vary with the type of cotton. Typically standard cottons are ginned using saw gins, while longer staple cotton is roller ginned. As a by-product, cottonseed is commonly used in animal feed (particularly dairy) and the extracted oil has many industrial and household uses. Ginning remains capital intensive even though the process has not changed markedly in the last twenty years. Similarly gins do not run for a full year and are only operating post-harvest. To balance out the cost of ginning equipment, marketing has taken on a global focus with major players usually located in all critical markets. The largest merchants account for over 50% of the world trade and are constantly looking to secure greater control over supply demands. Cotton is a supply-based market – when supply tightens prices will rise; however cotton is also price competitive with the

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synthetic fibres, particularly polyester. Sustaining price competitiveness with polyester is critical, as cotton has faced increasing market share pressure from the synthetic fibres as production has exponentially expanded in recent years.

**Figure 2.5 The Cotton Value Chain**



**International trade:** approximately 30-35% of cotton is internationally traded per annum. Cotton is typically traded only after ginning; international prices are determined based on lint not seed cotton. Cotton has an active futures and options market with several banks (including Rabobank) offering their own individually tailored over-the-counter (OTC) risk management products. Due to the international nature of trade, foreign exchange risk is also a pivotal element of the cotton business. There is also a high degree of volatility in futures and spot prices as grades and supply varies widely between origins. For example, tighter supply from Australia (due to drought) has supported stronger prices for SJV (San Joaquin Valley – denotes cotton that conforms to a specific, rather higher than normal, quality standard) type cottons from the US, helped along by a declining US dollar value.

**End use:** cotton's market share for textile end use is under pressure even though production continues to expand and consumption is actually rising. This reflects a faster rate of growth in synthetic production over cotton production (concentrated in SE Asia) versus a downward movement in cotton utilisation. Stocks of cotton continue to fall as consumption is outpacing production; this trend has slowed somewhat on the back of sharp price rises. However, cotton stocks remain low without any clear sign that they will rise to the formerly price oppressive levels of over 45% of annual consumption.

### 2.1.3 The different types of producers

Globally, cotton production is generally either in the hands of either a relatively very small number of large, mechanised farmers (Australia, USA, Brazil) or millions of smallholders (China, S Asia, W Africa) – see figure 2.6. Only the FSU, especially Uzbekistan, represents an intermediate farm structure.

Small farmers have different access to technology – hand application of pesticides (usually with knapsack sprayers), hand weeding and manual picking, though cotton quality can be high. Even within predominantly smallholder areas such as Pakistan, larger farmers have preferential access to research

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and extension. Farmers in the US, Australia and Brazil farmers use more herbicides, and mechanised soil preparation, pesticide application and picking.

**Figure 2.6 Large and small cotton farming systems<sup>9</sup>**

Country	Number of cotton farmers	Cotton area (million ha, 2003-04)
China	14 million	5.10
W and C Africa	2 million	2.51 (Franc Zone)
Pakistan	1.3 million	3.00
USA	25,000	4.88
Australia	1500	0.18
Brazil—Mato Grosso	200	0.31 (0.98 in total country)

In **China**, which is expected to produce 4.88 million tonnes of cotton in 2003-4 of a global total of 20.18 million tonnes,<sup>10</sup> 14 million smallholders are involved in cotton production.

**India and Pakistan** (2.72 and 1.72 million tonnes respectively) are also dominated by smallholder production. 60 million people derive income from cotton directly and indirectly in India, and there are 1.3 million cotton farms in Pakistan, half with less than 2 ha. In Punjab (India and Pakistan) agriculture is almost 100% irrigated, while central and southern zones of India are typically rain-fed.

Cotton production in **West Africa** (1.7 million tonnes) covers Mali (0.59), Benin (0.41), Burkina Faso (0.4) and Ivory Coast (0.37). Oxfam report that more than two million households are directly involved in cotton production in West Africa, with most farms average between 0.5-1.5 ha, and they employ large amounts of labour during planting, picking, and in other key seasons.

In the **Former Soviet Union** (FSU--1.46 million tonnes) especially **Uzbekistan** (0.91 million tonnes), 97% of crop production is conducted on irrigated land. Cotton production has halved since the 1980s. Partial reform of the agricultural sector has seen a large growth in the number of family farms and small farms. Small farms are expected to become the main agricultural producers in Uzbekistan: in 2002 there were around 72,000 small farms, 2,000 cooperatives, 3.3 million family farms, and 500 other private sector farms.

In the **USA** (3.96 million tonnes) there are only around 25,000 cotton farmers, with farm sizes ranging from an average of 800 ha in the Texas Plains to 200 ha in the Carolinas and Mississippi.

In **Brazil** (1.09 million tonnes), cotton acreage is moving from the south and northeast and into Mato Grosso, where there is much potential to expand the area under soy-cotton rotation. Mato Grosso has around 200 dryland (ie un-irrigated) cotton farmers, accounting for 50% of Brazil's cotton production, with an average 2,000 ha of cotton and three times as much in soybeans. These massive farms have large economies of scale, and are organised in cooperatives such as Unicotton.

In **Australia** (0.28 million tonnes), there are only around 1500 cotton farmers.

### 2.1.4 Financing requirements within the sector

Finance remains crucial for cotton farming, processing and trading. Cotton is an expensive crop to produce, yet this expense is concentrated in short periods of time, hence the need for pre-harvest finance and working capital to carry a farmer through the seasons. Similarly processing and trading of cotton requires substantial finance, which has become more sophisticated in recent years with a strong focus on the use of risk management/treasury products to control financing costs.

**On-farm finance:** Prior to harvest, banks provide money to fund production based on the forecasted incoming production via traditional channels (direct to farmers) and via third parties (e.g.

<sup>9</sup> Sources: USDA-FAS and USDA-ERS and misc. sources

<sup>10</sup> Converted from US Bales, where 1 bale = 480 lb = 217.724 kg. Source: USDA-ERS  
Better Management Practices Project for IFC and WWF-US: Phase 2 Commodity Guides  
IIED, ProForest, Rabobank 29<sup>th</sup> March 2004

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merchant/ginner). Recently the trend has been towards traditional seasonal finance as the re-finance cost via the third party has become less economically viable. Merchants who continue to provide pre-harvest finance are often now making this finance conditional on delivery of that cotton to them for trading purposes, to the dissatisfaction of many farmers who would prefer to market their cotton with a number of merchants.

**Ginning working capital:** Cotton ginning occurs in a relatively concentrated time frame, yet in many cases as the gin is owned by a trading company sales will occur over a full year. As a result, it is not uncommon to see a short term injection of working capital from banks to ginning operations during this period of the year.

**Trade finance:** International traders require financing in order to be able to buy cotton in one location, transport it to another country and deliver it to a buyer. Finance is required to bridge the gap between paying for the cotton and receiving payment in turn. There has been a movement away from traditional Letters of Credit towards products that incorporate a higher degree of risk management, such as Total Return Swaps.

**Project finance:** Finance is required for any expansions, upgrades and green field projects that processors may wish to carry out. Project finance for cotton is usually for green field ginning or warehousing projects.

The international banking of cotton is undertaken by relatively few banks, yet in local markets where cotton remains an important commodity to the wide economy, smaller banking operations find it an acceptable risk for their portfolio. Government-backed finance remains crucial, particularly in developing markets (West Africa) where it is harder for bigger banks to manage risks or where they are unwilling to get involved to that degree.

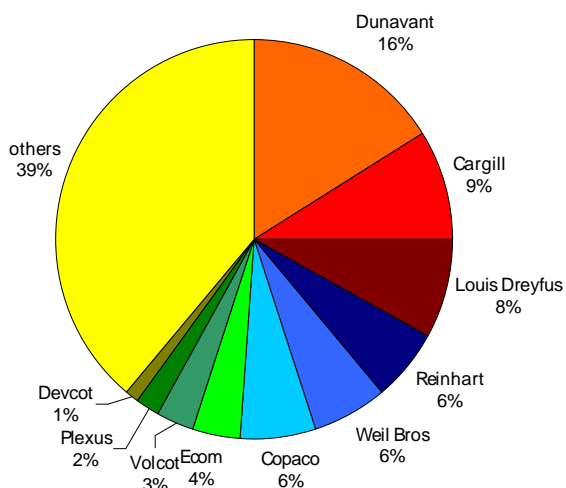
### 2.1.5 Key players and financiers by region

Merchant operations within the cotton sectors are largely controlled by private companies so estimating market share is largely based on anecdotal evidence. However, figure 2.7 shows that while several companies have comparable market share, no one company dominates the entire system. Similarly, the range of activities within this group is shared between integrated operations (merchandise, ginning and marketing) through to specialist operations (ginner-merchant, merchant, or ginner).

Nearly all of these companies have a global presence across developed and developing markets. Access to finance for most of these companies is relatively easy; they are usually financed by local banks and for trade via a diverse selection of international banks. Some of the bigger banks to the cotton sector include Rabobank International, ABN Amro, BNP Paribas, Soc. Gen., Standard Chartered and Macquarie Bank. Local banks also play an important role in financing major exporters, e.g. in Australia (ANZ, NAB) and in the USA (CoBank, Bank of America). Below we present a breakdown of key players and financiers by region; this is followed by a summary of major traders and end users and their financiers, and other key stakeholders in the sector.

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**Figure 2.7 Market share by company of global cotton trade<sup>11</sup>**



### Europe & US

Cotton is usually processed into yarn or fabric and in many cases finished textile products before reaching the European borders. This allows some developing nations (particularly North African countries) to take advantage of preferential trade agreements which ensure access to the European markets. Only a limited number of European companies have invested into offshore processing, typically the focus remains local and geared towards capturing value via branding and product image/quality.

Commercial banks operating within the wider textile sector in **Europe** include; Rabobank International, Credit Agricole, Credit Lyonnais, Societe Generale, ABN Amro, ING, BNP Paribas and UBS.

Cotton within the **US** is a major agricultural industry. Production finance remains highly integrated with the local banks and credit unions although Bank One, Bank of America and Wells Fargo used to be highly involved in providing agricultural finance. More recently farm finance has been provided by input suppliers and merchants, while long term debt is handled by smaller local operations. The textile sector within the US is approaching the end of a long period of structural adjustment as investments have moved to lower cost regions of production, such as Mexico and Asia. This trend will not reverse and for those companies that anticipated this development, access to funding remains relatively easy. Commercial banks operating within the wider cotton and textile sector in the US include; Rabobank International, CoBank, Bank of America, Wells Fargo, Chase Manhattan, GE Capital, Citigroup, Goldman Sachs and Merrill Lynch (excluded from this list are local banks in the individual cotton producing states).

### Asia & Middle East

Asia and more specifically, **China**, is a critical link in the cotton textile system. Figure 2.8 provides a summary of the interests of some key financial institutions operating in the region. Local banks will finance production while many international banks are actively pursuing relationships in downstream textile activities throughout the region. China, India and Pakistan all have large home markets but continue to expand their export capacity to maximise scale economies in textile production.

There are literally hundreds of small spinning and milling operations, some which work collectively to supply bigger manufacturers and others that are horizontally integrated in the chain. A recent trend has been the outsourcing of textile manufacturing and assembly to create a break in the chain and thus company image protection due to the 'sweat shop' issue that plagues the wider textile sector. As such,

<sup>11</sup> Source: Rabobank International, 2004.

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it is somewhat difficult to trace large brand name companies and their banking relationships into the Asian region.

**Israel, Syria, Egypt and Turkey** are key regional cotton producing countries within the Middle East. 'Egyptian' cotton (and similar types/quality produced in Israel and Syria) attracts a considerable price premium based on the quality of the lint produced. Supply is not large and production costs within this region are relatively high. Local banks are key sources of production finance and unless for specific types of lint, trade remains focused on local markets only. Turkey has room to increase the capacity of its cotton sector both in production and processing systems. Access to finance would improve should Turkey be admitted into the European Union; however this remains unlikely in the short term.

**Figure 2.8 Institutions financing cotton production in Asia/Pacific and the Middle East**

Institution	Country
<b>International banks</b>	
ABN Amro	China, India, Pakistan, Indonesia
Bank of Nova Scotia	China, India, Indonesia
Societe Generale	India
Standard Chartered	Indonesia, Taiwan, Malaysia
UBS	China, Taiwan, Singapore, Australia
Citibank	Singapore, India, Hong Kong
HSBC	Singapore, Hong Kong, China, Vietnam
<b>Local commercial banks</b>	
State Bank India	India
Bank of Punjab	India
Bank of Khyber	Pakistan
Union Bank	Pakistan
Kwangtung Provincial Bank	China
Hang Seng Bank	China, Hong Kong
National Australia Bank, Commonwealth Bank	Australia, New Zealand, South East Asia
Macquarie Bank, Australia and New Zealand Bank	Australia, South-East Asia
Arab Bank Group	Middle East
Gulf International Bank	Middle East
Saudi British Bank	Middle East
Sumitomo Bank	Middle East, Japan
Mitsubishi Banking Corporation	Japan, Middle East
Riyad Bank	Middle East
<b>Development institutions</b>	
Chinatrust Construction Bank	China
Arab National Bank	Middle East
Islamic Development Bank	Turkey and Middle East, Central Asia

**Uzbekistan, Kazakhstan and Tajikistan** are all cotton producing countries. In Uzbekistan, agriculture has been semi-privatised since independence in 1991, and the Government of Uzbekistan has "expressed its commitment to promote a voluntary transition of farm management from the public sector to the private sector." The state monopoly on the export of cotton fibre has been lifted and farmers are allowed to export some of their product through specialized agents. Government contracts were introduced for 50% of actual rather than planned production. Prices for cotton in government contracts now approach world market prices. But according to the World Bank, the reforms in Uzbekistan have not yet provided cotton farmers a viable alternative to selling to the state--monopsonistic government procurement remains in place, and there are "significant vestiges of centralised planning for cotton and the rest of its economy". Farmers of the former state and collective farms still control the majority of water and inputs. Uzbekistan now has five cotton corporations which grow, process, package and distribute seeds.



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A large proportion of cotton from this region is processed in China or India, thus financing arrangements in those markets is a stronger indicator of relevant parties and institutions. Rabobank International is involved in providing risk management products for cotton in Central Asia. Government involvement in the provision of finance to production remains high via loans, tax concessions, input subsidies and other non-direct finance mechanisms.

In **India**, The Cotton Corporation of India (CCI), a government agency, is responsible for providing price support in all states except in Maharashtra, where there is state monopoly procurement.

### Africa

Cotton is produced widely throughout Africa, yet it is most successfully concentrated in the former French colonies of West Africa. Not surprisingly many French banks are still involved in providing finance to these markets yet most of the activity is restricted to trading operations as compared to the financing of on-farm production. Sourcing finance for new projects in Africa remains challenging given the limited certainty of economic and political stability in many cotton-producing countries. Figure 2.9 provides a summary of the interests of some key financial institutions operating in the region

For cost efficiency reasons a large proportion of West African cotton is exported as raw unprocessed lint to more cost efficient textile processing zones (typically Asia). There is limited processing of cotton into finished textiles within Africa and much of what is processed is destined for local consumption. African nations do have preferential access into European and US markets, yet lack the investment and scale of Asian counterparts.

**Figure 2.9 Institutions financing cotton production in Africa**

Institution	Country
<b>International banks</b>	
Rabobank International	West Africa, trade finance
Standard Chartered	West Africa, South Africa, multiple
Societe Generale	West Africa
BNP Paribas	West Africa
Barclays	West Africa, Sub-Saharan Africa
<b>Local commercial banks</b>	
Bank of Zimbabwe	Zimbabwe
FirstRand Bank	South Africa, Zambia, Zimbabwe
<b>Development institutions</b>	
West African Development Bank	West Africa
Capital for Development (former CDC)	via subsidiary funds in regional markets
African Development Bank	Continental
OPEC Fund for International Development	Continental via mainstream country lending

### Americas

Brazil has enormous potential to become a world leader in production of cotton. Production has been negatively affected by seasonality and pest infestations in recent years, which in turn affect the consistency of supply for export inhibiting Brazil's ability to form long lasting relationships with importing countries. The cotton sector remains largely governed by cooperative businesses although merchants including Dunavant, Reinhart, Volcot, Ecom and Cargill have been active for some time.

Again production finance is controlled via local institutions, Banco do Brasil and Banco Sanfra for example with international banks assisting in the provision of risk management and trade finance. International banks active in Brazil include Rabobank International, ABN Amro, Merrill Lynch and Macquarie Bank. Major development institutions include the Inter-American Development Bank.

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In other parts of South and Central America production finance has in the past been provided against inputs for small and large farmers. As noted this has increased the risk to the input supplier but appears to be an effective way to ensure product consumption. Security is taken against the incoming crop however given the high proportion of rain-based production of cotton in the Americas this is considered risky. Governments and central banks are also critical suppliers of finance, especially to small landholders.

### Traders and end-users

The international cotton trade is effectively controlled by a small number of companies. Even though individual market shares appear small, ten companies control over 60% of the world trade. In countries such as Uzbekistan the government still plays a substantial role in the marketing of raw cotton but in practice act as an intermediary between the farmer and other international merchants such as Cargill or Dunavant. A similar situation exists in China, whereby the Supply and Marketing Corporation (SMC) heavily influences the flow of Chinese cotton from farm to fabric. As such markets deregulate it is expected that the overall market share of the largest traders will rise over time.

In contrast the number of end users of cotton is enormous. Depending upon the quality characteristics cotton will be utilised in industrial lining right through to tailor made business shirts. Other uses include currency, insulation, soap, waterproofing products and tents. The end use will influence the location for processing and consequently the intermediaries capable of providing the finance.

The number of banks and financial institutions involved in this section of the value chain is in practice immeasurable. In conjunction to the traditional banks, venture capitalists and fund managers are involved in the cotton sector from taking a stake in cottonseed companies to refinancing insolvent spinning and manufacturing operations. Finally given the global nature of the textile companies and cross border operations in spinning and manufacturing, companies hold loans in different countries. For these reasons, there is no simple shortlist of banks involved in financing these players.

### Other stakeholders

- Branded garment companies e.g. Timberland, Nike, Adidas, Patagonia, Gucci, H&M, Hugo Boss, Benetton, Gap, Levi Strauss, The Limited, Marks and Spencer.
- Mail order companies e.g. Otto (Germany) Neckermann.
- Retailers e.g. Tesco, Asda, Monoprix, Co-op.
- Other relevant companies include Bienestar International (No Sweat Apparel) and Bo Weevil BV. Asian EPZ employers include Pou Chen, Tri-Star, Ramatex and Target.
- NGOs including ICAC, FAO, NCC, WWF (Thirsty Crops), Oxfam, Cleaner Cotton Campaign, Clean Clothes Campaign, Ethical Trade Initiative, UNITE! (Union of Needletrades, Industrial and Textile Employees), Pesticide Action Network (PAN-UK).

### 2.1.6 Macro issues facing and affecting production

Policy developments play a large role in the global cotton industry – as both a commodity and textile input. One widely expected future trend is the increasing dominance of China in the textile complex, particularly the post-2005 final phase-out of the Multi-Fibre Agreement (MFA). China is however to become a long-term net importer of cotton as demand grows faster than local supply. Another issue for the future is pressure being applied to the current US Farm Bill. Initially it has been challenged by Brazil and others at the WTO and was collectively attacked during Cancun negotiations by West African nations. It is unlikely that there will be any immediate reform in any US programmes heading into an election year, but observers have commented that Brazil has built a particularly strong WTO case for reform. Other trends expected include a fall in production in Uzbekistan, a return to normal production in Australia, a rise in exportable supplies from West Africa, rising consumption in Turkey and a greater role for Brazil in export markets.

### 2.2 Key sustainability impacts

Sustainable cotton **production** centres around two key themes—the **management of water** and the **management of pests**. This is because, of the major agricultural commodities, cotton is highly water-intensive and, due to a long growing season and fruiting pattern, highly pest-sensitive. 73% of global cotton production comes from irrigated land, and the crop, on just 2.5% of the world's arable land, accounts for 25% of global insecticide consumption. Cotton is rightly associated with ecological crises around water and toxics in semi-arid and water-scarce areas—the Aral Sea, the drying of the Yellow River in eastern China, and pesticide overload on a very wide scale.

Many social issues are connected to these factors—worker poisoning and illnesses from pesticides during application (men) and harvesting (mostly women). Child labour remains a discrete social issue in South Asian and West African production. Biotechnology, especially genetic modification (GM), is another 'big issue' where cotton is at the centre. Transgenic cotton was grown on 7.2 million ha in 2003, representing 21% of the 34 million ha under cotton and 11% of the global GM area.<sup>12</sup> There are two main attributes in GM cotton—insect protection ('Bt' crops such as Monsanto's Bollgard®, containing the gene from a soil bacterium, *Bacillus thuringiensis*) and herbicide tolerance (such as Roundup Ready®). Herbicide tolerance is a benefit to large-scale mechanised farming systems. But varieties of cotton engineered to produce their own bio-insecticide gene are also attractive to small farmers, due to cost savings and reduced health risks from applying insecticides with knapsack sprayers.

As a non-food crop, biotechnology has been a much less controversial feature in cotton production compared to maize, soy and oilseed rape, though cottonseed oil is extracted for human consumption, and the residue, cotton seed cake, is an important animal feed. Loading of the soil with the Bt toxin, and gene transfer to wild relatives ('genetic pollution') may have unanticipated consequences for biodiversity. Furthermore, the large-scale plantings of Bt cotton are placing a huge selection pressure on cotton pests and will inevitably lead to the development of resistant strains that will condemn the technology to same fate as many other non-durable technologies that take a frontal rather than systemic view of crop protection.

So the long-term environmental and social consequences of GM cotton are ambiguous, but so far the market is clear—there are few if any premiums for GM-free cotton.

In **manufacturing**, the **discharge of untreated effluents** into water and soils by the textile industry is the main issue. Liquid effluents from washing, dyeing, and bleaching operations contain organic and inorganic chemicals such as chromium. Discharge of untreated effluents into water bodies lowers dissolved oxygen levels and threatens aquatic life. Worker health and safety is threatened by air pollution in small textile units with risks of lung disease among workers.

The two most significant issues – pests and water management – are remarkably similar across cotton growing regions.

#### 2.2.1 Environmental impacts

In **China** the cotton crop is associated with falling water tables and unreliable surface water in Yellow River region, and reduced water flow in the Yellow River. GM has played a role in reviving production in the Yellow River region, after a crisis of bollworm infestation and associated yield loss and pesticide hazards. But infestations of *Lygus* bugs, red spider mites and whitefly still are requiring large insecticide use even on GM varieties.

**India and Pakistan** the pesticide treadmill continues to spin – half of national pesticide consumption in both countries is on cotton – leading to insect resistance and insect pressure (bollworms, whitefly,

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<sup>12</sup> International Service for the Acquisition of Agri-Biotech Applications (2003) Global Status of Commercialized Transgenic Crops: 2003. [www.isaaa.org/Press\\_release/Briefs30-2003/es\\_b30.pdf](http://www.isaaa.org/Press_release/Briefs30-2003/es_b30.pdf)  
Better Management Practices Project for IFC and WWF-US: Phase 2 Commodity Guides  
IIED, ProForest, Rabobank 29<sup>th</sup> March 2004

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virus). Consumption of pesticides in Pakistan increased from 665 tons in 1980 to 47,592 tons in 2002 without accompanied increase in yields (Figure 2.10). Counterfeit pesticides are a serious problem.

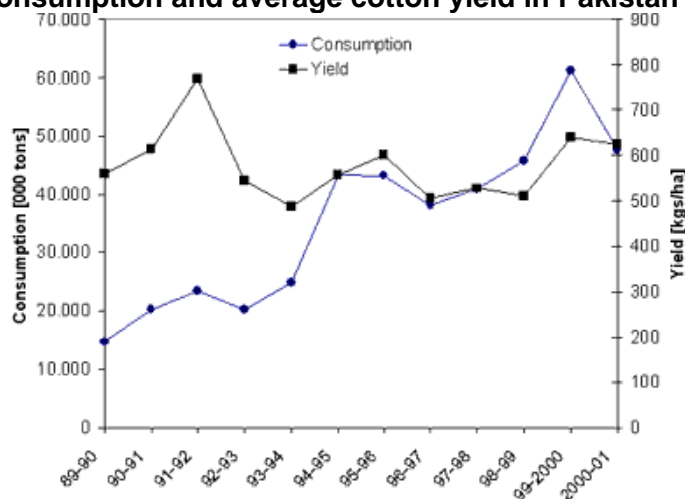
Heavy toxic pesticide use is associated with major impacts on biodiversity, such as birds and fish. Total external costs of pesticide use in Pakistan cotton are estimated at nearly Rp 12 billion (USD 200 million). Irrigated cotton suffers from soil water logging and salinity, and contributes to reduced water flow (eg Indus Delta) and brackish tubewell water in Pakistan.

In the **USA** cotton irrigation is, with livestock production, associated with serious reductions in flow in the Rio Grande basin. Pesticides and defoliants are still associated with worker illnesses. Faced with rising labour costs, the US apparel industry is moving offshore.

Pesticide use in **West African** cotton is associated with insecticide resistance, worker and family exposure to pesticides through cotton weeding and harvest, the application of cotton pesticides to food crops, and the accumulation of residues in animal feed and meat.

In the **Former Soviet Union** especially **Uzbekistan**, improper drainage – which means that 50% of the land has to be “washed” in winter – plus overuse and wastage of water, rising ground water tables, salinisation of soils and development of a hard crust are serious problems. Water diversion and reduced water flow, especially into the Aral Sea, have led to an environmental and social catastrophe. Other problems associated with cotton are the impact of saline drainage effluent on wetlands, reduced quality of drinking water, soil contamination from agricultural chemicals including DDT, and human health problems, including pesticides and salts blown from the Aral Sea bed. Uzbekistan has been an important source of cotton for many years but environmental degradation resulting from monoculture in production and over intense use of resources has now started to directly impact on current productive capacity. Production in Uzbekistan has fallen in the past two years and without considerable new investment in irrigation infrastructure and natural resource regeneration it seems that this will continue over the coming three to five years. Beyond that, the sustainability of production agriculture will become increasingly difficult.

**Figure 2.10 Pesticide consumption and average cotton yield in Pakistan 1990-2001<sup>13</sup>**



In **Australia** the cotton industry has accounted for almost 10% of all the water used in the country – more water than all of Australia's seven million households put together. Reduced flow in Murray-Darling River basin has impacted wildlife. Improper irrigation is associated with salinity, waterlogging, and groundwater pollution.<sup>14</sup>

<sup>13</sup> Source: Global IPM Facility.

<sup>14</sup> *The Age* 1 October 2002 <http://www.theage.com.au/articles/2002/09/30/1033283436065.html>

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### 2.2.2 Social impacts

**Child labour.** Bonded child labour is extensively used in cotton farms in Pakistan. 400,000 girl children (between the ages of 7 –14) are hired to work in cottonseed fields in hybrid cottonseed production in India, out of which 250,000 are employed in Andhra Pradesh. 60% of the girls currently employed in cottonseed fields are school dropouts.

**Sweatshop manufacturing.** A 'race to the bottom' affects many of the world's 43 million Export Processing Zone (EPZ) workers, with poverty wages and substandard working conditions in apparel manufacturing and widespread evidence of harassment or dismissal of union organizers. International attention has been focused on big brand name companies, as a way of exposing poor practices, although this approach alone is insufficient to address the systemic challenges that face labor practices in the sector.

### 2.3 Prospects for taking a BMP approach

#### 2.3.1 Which of the key impacts a BMP approach could seek to address

The two key issues of **pest** and **water** management in cotton are both conducive to a BMP approach. Both are win-wins, reducing the cost of production – which has reached very high levels in some countries – and preserving the natural resource base. There is a high level of consensus of what needs to be done; by addressing only two problems through BMPs, the key environmental and social impacts can be dramatically reduced. For instance, water management can reduce withdrawals from rivers and groundwater, protect soil from salinisation, *and* preserve downstream habitats (wetlands, estuaries) from saline drainage water. Pest management can both prolong the effective life of pesticides *and* reduce health hazards of applicators and pickers. But both pest and water management must be applied on an **area-wide** basis to be effective, and this is the challenge of BMP implementation.

#### **Irrigation water management:**

Overall efficiency of water use in irrigated cotton is low, with only 20-50% of diverted waters actually reaching the crops. There are two basic means by which water-use efficiency can be improved: either increasing the share of water actually taken up by plants from irrigation water, or producing more crop per unit of water. BMPs include maintaining water deficit conditions in non-critical growth periods, and drip, sprinkler and alternate furrow irrigation. This does not apply to upland cotton e.g. of Brazil, southern India, W Africa and parts of the US.

Water management is also linked to improved soil structure which gives a higher water retention capacity, e.g. from shallow soil cultivation, mulching, low- or zero-tillage, or organic production. Farmers in Israel have reported that cotton grown under organic conditions requires around 30% less water than cotton grown under conventional practices. This could be related to better soil structure and a higher water retention capacity. Improved land management also helps reduce soil erosion, soil compaction and salinity.

#### **Pest and pesticide management:**

BMPs are largely aimed at improved pesticide application to reduce the quantity of pesticide missing the target, and improved pest management, through integrated pest management (and GM). BMPs include crop scouting and use of economic thresholds, use of selective insecticides, conservation of natural enemies e.g. through the use of cover crops, and crop rotation. Effective pest management is closely linked to water and fertilizer management – increased general plant health and reduced stress means less pest damage.

#### 2.3.2 To what extent there is agreement on BMPs

There is a high degree of global agreement on BMPs for pest and water management in cotton. The days of suspicion or outright hostility to IPM in the pesticide industry are long over. Social BMPs such as the end of child labour are more controversial; in West Africa, for example, children form an important part of the family labour force during harvest.

### 2.3.3 To what extent different BMPs would be required for different types of producers and different regions

It is the organisation and governance of the sector – extension, provision of services, inputs, credit, and marketing – which will have overriding impact on both the area-wide implementation of BMPs and the ability to certify producers and produce. The situation is confused by various levels of transition of extension and marketing systems from heavy state control to fully privatised arrangements.

In **Pakistan and India**, a crisis in extension has been acknowledged. On the ground, it is the pesticide company representatives and pesticide dealers who provide the majority of advice. Both private sector and public extension services have a clear bias towards large farmers<sup>15</sup> due to ingrained systems of performance measurement and political patronage. There are low levels of collective farmer organisation. Individual farmers spray at different times, with poor knapsack sprayer equipment and often counterfeit pesticides. Because cotton production requires heavy investment and borrowed capital, smallholders are often highly indebted and are therefore very risk-averse and likely to apply excessive amounts of pesticides to protect their investment. Most financing in India is done through chemical and seed companies, though government annually establishes minimum support prices for cotton. Under these anarchic conditions, where obtaining high quality information and high quality inputs is dependent on farm size and educational status, the area-wide implementation of BMPs is very difficult.

**China** and the **FSU** are in transition from state control to semi-private systems. In **China**, cotton is sold through government-run procurement stations, though some private cotton dealers have emerged. Dismantling of the government-set cotton procurement price has caused cotton farm incomes to plummet. Extension comes from same place as pesticide sales, with associated problems of vested interests.

In **West Africa** there is still much of the tightly controlled, vertically integrated and paternalistic *encadrement* agricultural system in place, in which seeds, inputs, credit, transportation, ginning and marketing of the crop are handled through a parastatal cotton ginning company. This system has been used throughout Francophone Africa with great success in terms of cotton yield and quality. The parastatals were only been part-privatised in the 1990s compared to the full liberalisation seen in Anglophone Africa. For example, in 1996, the government of Cote d'Ivoire adopted a privatisation plan for its cotton parastatal, CIDT, but the majority of capital shares in the 'privatised' companies' are held by the state, and by the French cotton development parastatal CFDT. Crop production is guided and supervised by technical agents in order to meet specified production quotas and quality standards. The persistence of vertical integration has big implications for area-wide IPM.

In **Turkey**, the gins play an important role in domestic marketing channels. Each year the Turkish Government announces seed cotton support prices prior to harvest at a level below international prices.

In **Brazil, Australia** and **USA** large scale producers organised as cooperatives can conduct their own research, such as testing different varieties and production practices for improved yields, fibre quality, disease resistance and weed tolerance, supported by state research and extension infrastructures.

### 2.3.4 Examples: Where BMPs have already been identified and/or implemented

#### Integrated Pest Management (IPM)

In Brazil, IPM has been adopted by 60% of growers. Pesticide applications have been reduced from 22 to 12 per season, even with new boll weevil pest *Anthonomas grandis* present. As a consequence there

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<sup>15</sup> Davidson AP(2002) Privatization and the Crisis of Agricultural Extension in Pakistan: *Caveat Emptor*. World Bank-ARD.

[http://lnweb18.worldbank.org/ESSD/ardext.nsf/26ByDocName/PrivatizationandtheCrisisofAgriculturalExtensioninPakistanCaveatEmptor/\\$FILE/PakistanDavidson.pdf](http://lnweb18.worldbank.org/ESSD/ardext.nsf/26ByDocName/PrivatizationandtheCrisisofAgriculturalExtensioninPakistanCaveatEmptor/$FILE/PakistanDavidson.pdf)



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have been no major new pest resistance occurrences in the past 20 years. The remaining challenge, according to Sagenmüller/Aventis CropScience, is supplying smaller producers.<sup>16</sup>

The most comprehensive attempt to get IPM adopted in smallholder cotton has been the FAO-EU Cotton IPM programme, a five-year project devoted to implementation of an IPM strategy in Bangladesh, China (Mainland), India, Pakistan, Philippines and Vietnam. This uses the farmer field school system first developed in rice by the FAO, and has financial support from the EU. In India, farmer participatory trial of identified 'best-bet' IPM package in two villages reduced insecticide use by 40% and increased yields by 40%.<sup>17</sup> In China, significant reductions in pesticide application and increase in profitability and conservation of beneficial fauna followed IPM training in Shandong, Hubei and Anhui Provinces.<sup>18</sup> In Pakistan, research trials in Punjab saw insecticide applications reduced from 6 to 2 per season, with economic returns 20% higher.<sup>19</sup>

### Organics

World production of organic cotton amounts to 6,000 tons of fiber annually, or about 0.03% of global cotton production. Turkey produces the most at 29%, with the US second at 27% and India third at 17%.

### ICM and Integrated Production

In Australia the Best Management Practices Programme is the result of an initial joint research effort involving the CRDC, Land and Water Australia, and the Murray Darling Basin Commission. A BMP manual has been developed which allows self-assessment of farm practices against BMPs, most importantly those having to do with application of chemicals; and an auditing system is managed by Cotton Australia.<sup>20</sup> It is a voluntary risk assessment programme that helps producers document what they need to achieve best practice on their farm. 55% of the 2002-03 crop was produced using the BMP approach. By June 2003, 40 Area Wide Management Groups have been established in cotton valleys to tackle environmental and on-farm issues across catchments. Cotton BMPs include safe chemical storage and handling, reduced chemical usage, minimising erosion, minimising storm impacts, IPM, good communication with neighbours, spray operators and advisers

A series of two audits (each costing AUS 500 plus costs, which may be reduced by grant money) and associated paperwork can lead to certification, followed by periodic surveillance audits looking for continuous improvement. Using the completed self-assessment, the initial audit checks compliance against BMPs and identifies strengths and weaknesses. A second audit (within 14 months) checks compliance against BMPs, and also progress on action plans and areas of improvement identified in the initial audit. Surveillance audits occur thereafter at roughly 18-month intervals.



Cotton Australia lists the longer-term benefits resulting from the BMP process as: access to chemicals, access to water, reduced input costs, lower insurance premiums, better access to finance, tax concessions, government grants for BMP works on farm, premium price for BMP cotton, license to continue to grow cotton, access to new markets, and greater demand for Australian cotton on a world scale. The next step may be ISO14001 accreditation. A new brand of 'BMP' cotton will enable international buyers to acquire 'green' cotton from Australia—a rare example of where agricultural BMPs have been marketed using an ecolabel.<sup>21</sup>

<sup>16</sup> [www.sustdev.org/journals/edition.02/download/sdi2\\_2\\_1.pdf](http://www.sustdev.org/journals/edition.02/download/sdi2_2_1.pdf)

<sup>17</sup> [www.cottonipmasia.org/India.htm](http://www.cottonipmasia.org/India.htm) and [www.wis.cgiar.org/rwc/shared/asp/projectsummary.asp?Kennummer=2743](http://www.wis.cgiar.org/rwc/shared/asp/projectsummary.asp?Kennummer=2743)

<sup>18</sup> [www.cottonipmasia.org/Countries/China.pdf](http://www.cottonipmasia.org/Countries/China.pdf)

<sup>19</sup> [www.cottonipmasia.org/Countries/State%20of%20IPM%20in%20Pakistan%20%202003.pdf](http://www.cottonipmasia.org/Countries/State%20of%20IPM%20in%20Pakistan%20%202003.pdf)

<sup>20</sup> [www.cottonaustralia.com.au](http://www.cottonaustralia.com.au) See also [www.iatp.org/labels/envcommodities/appendixII-c.html](http://www.iatp.org/labels/envcommodities/appendixII-c.html)

<sup>21</sup> [www.cottonaustralia.com.au/bmpindex.html](http://www.cottonaustralia.com.au/bmpindex.html)

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In the USA, BMPs for upland cotton have also been developed by state extension services, including conservation tillage, and cover crops.

In India, contract farming between farmers and mills is being explored as a means of ensuring the application of 'integrated farming' BMPs, in part through securing the availability of certified seed, quality fertilisers and pesticides. This is being tested on an experimental basis in Gujarat, Madhya Pradesh, Andhra Pradesh and Orissa in 103 villages with an area of 3000 ha involving over 3,000 farmers, coordinated by the CCI.

### Water management

Low-cost drip irrigation systems can make water savings of up to 80%. Field studies in Pakistan reported by WWF have shown water savings of close to 50% through various furrow irrigation methods compared to flood irrigation.

### Dyeing, processing and finishing of cloth.

Primary treatment and secondary eg activated sludge treatment can reduce BOD levels by 94 %.

### Apparel manufacturing

The Clean Clothes Campaign and Ethical Trade Initiative have shown that even where breaches of labour laws are frequent such as in the Chinese context, substantive improvements are still possible under certain conditions, but this still represents only a miniscule proportion of the total market.

## 2.4 Obstacles to the adoption of BMPs

### 2.4.1 Producer level

#### Pest Management:

As noted above, building IPM skills among smallholders in order to achieve area-wide ecosystem management has huge scale challenges, with 14 million smallholders involved in cotton production in China; 1.3 million in Pakistan, and 2 million in West Africa, growing cotton is mainly on small plots (Table 1). The huge investments in Australia to achieve BMP adoption and certification by less than 800 growers is a powerful reminder of the scale of the challenge. Community IPM in rice, even though already implemented for 15 years in China, could only reach 1/1400 of the total rice farmers who have the opportunity to Farmer Field School (FFS) training, including developing scientific research methods for farmers.<sup>22</sup> A review of the training figures of the FAO-EU cotton IPM programme in participating countries leads to the same conclusion, that even with the current resources and political will, the logistics of building skills among millions of smallholders, beyond the usual cadre of well-served 'contact' farmers, is an unattainable goal under current extension models. For example, between 2001 and 2003, 7362 farmers were trained in Pakistan, representing 0.6% of the cotton farming population. The challenge increases with a transition from state control of commodities to liberalised market arrangements. But the FFS approach, with the potential for self-sustaining farmer-to farmer linkages, has to be taken seriously as an alternative to the failed trickle-down models of agricultural extension.

### Water management

A major obstacle to improved water management in cotton is the absence of community management of irrigation systems or market pricing for water resources. Irrigation infrastructures may also be aging and wasteful. Where water is provided free of charge, as it has been in Uzbekistan (where water charging in only started 2003), there is inevitably a tendency to over-irrigate. Market pricing of water

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<sup>22</sup> A recent World Bank report claims that the benefits of the Indonesian FFS in rice have been overstated both in terms of pesticide reduction and yield improvements. G. Feder, R. Murgai, and J. B. Quizon (2003) Sending farmers back to school: the impact of farmer field schools in Indonesia  
[http://econ.worldbank.org/files/25643\\_wps3022.pdf](http://econ.worldbank.org/files/25643_wps3022.pdf)



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resources shifts irrigation water from a social to an economic good. Although effective in stimulating increased water use efficiency<sup>23</sup>, charging may put a large additional financial burden on smallholders.

### 2.4.2 Throughout the value chain

#### Low prices and lack of market incentives

But the most profound challenge to the adoption of BMPs in cotton is the lack of market incentives. As a non-food crop with a complex chain between farmer, ginnery, apparel manufacturer, brand owner and retailer, there are only very weak signals percolating down to producers demanding more environmentally sound production or processing, other than the micro-niche of organic cotton. A report for the CSIRO in Australia in 2000 states that the study had “not revealed any evidence of market-driven EMS for cotton at this time or in the foreseeable future.”<sup>24</sup> The biggest incentives for BMP adoption were very indirect: (a) the value of cottonseed by-product for animal feed could be higher when BMPs ensure minimum pesticide residues; and (b) BMPs could secure cotton producers’ right to farm and continued access to water in the future, in a climate of water scarcity and growing criticism of the sector.

Lastly, low cotton prices caused by oversupply may mean that producers do not see how they can start investing in social or environmental improvements until low prices are addressed.

### 2.5 Preconditions for the successful adoption of BMPs

BMPs have been successfully implemented in cotton production systems dominated by relatively very small numbers of large producers – in Brazil, USA and Australia. These large producers have access to technology, extension advice and perhaps grants to implement BMPs. Furthermore, they see the area-wide benefits of collective action, whereby changes in practices across large contiguous areas can make a profound impact on, for example, the rate of emergence of insecticide-resistant pest species. BMPs in cotton can thus be classic win-wins, as they reduce production costs, increase the effective life of pesticides, and extend the productive life of irrigated soils, and reduce health-associated problems.

For small producers, technical support is weak or absent. And the benefits of collective action are far less tangible, compared to the countervailing individual incentives to apply frequent insurance applications of pesticides and use excessive amounts of irrigation water. There is risk that leveraging wider implementation of BMPs, e.g. through attaching BMPs to crop finance, could entrench the scale advantages of larger and more educated cotton producers. They must be approached in a way that minimises such inequalities, through a combination of farmer organisation and sensitive design and implementation of BMPs.

#### Farmer organisation – cooperating to compete

BMPs are all about unification of production goals, higher levels of specification, coordination of technology use and improvement of scheduling. If small producers are to compete with larger producers in a chronically oversupplied market, and make successful connections with agribusiness through initiatives such as adoption of BMPs, the organisation of producers is key to making the necessary linkages to the market (e.g. through contract farming), as well as links to the providers of research and advice, and with the state. This can be achieved through top-down vertical integration along the lines of the West African model, or through the bottom-up logic of small farmer economic organisations or new-generation cooperatives. Participation in economic organisations can bring significant benefits when farmers are faced with management requirements, such as the regulations and inspections associated with BMPs.

#### A certification system adapted to the reality of small producers

<sup>23</sup> Johansson, R C (2000). Pricing irrigation water: a literature survey. Policy, Research Working Paper PS 2449, World Bank.

<sup>24</sup> Heinze KE (2000). Credible Clean and Green: Investigation of the international framework and critical design features of a credible EMS for Australian agriculture. CSIRO. [www.clw.csiro.au/publications/ems.pdf](http://www.clw.csiro.au/publications/ems.pdf)  
Better Management Practices Project for IFC and WWF-US: Phase 2 Commodity Guides  
IIED, ProForest, Rabobank 29<sup>th</sup> March 2004

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Involvement of producers is key to the development of equitable BMP standards and certification processes, as is the encouragement of group certification or group contracting by groups of small producers to reduce certification and transaction costs.

### **A non-hostile pesticide industry**

The pesticide industry's sales strategy has been seen as an obstacle to IPM, but examples of Aventis in Brazil and other companies show that the industry also can get firmly behind the concept as it is also in their long-term interests. A greater challenge is the manufacturers of generic products, which have huge market shares in India and China but provide little or no technical support in the field. Investing in firms that have sales staff rewarded on service rather than entirely on commission would be a clear first step for the financial sector.

### **Legal and policy environment for successful contract farming,**

Successful farmer collective action requires institutions that enforce contracts impartially and secure long-term property rights.

### **End of subsidies, market distortions, and trade barriers**

In relation to inputs, BMPs rely on proper water pricing and investments in irrigation infrastructure that supports rational use. In relation to outputs, investment in BMPs will be severely curtailed by price distortions caused by dumping of subsidised produce onto world markets and trade barriers. According to Oxfam, every acre of cotton farmland in the US attracts a subsidy of \$230. In 2001/02 US cotton farmers received subsidies amounting to \$3.9bn.

## **2.6 Risks of adopting a BMP approach**

The key risks of adopting a BMP approach in the cotton sector include the following:

- **Allocation of costs:** Given few, if any, financial incentives for the adoption of BMPs, there is a risk that the burden of any associated costs will fall disproportionately on producers, with little if any compensatory financial return.
- **Exclusion from markets:** If a BMP becomes a market-entry standard, or a means to a premium, there is a risk of any producers that are unable to implement it being excluded from markets. This is potentially particularly significant for small growers who may not have sufficient capacity. Any BMP approach should therefore be appropriate and realistic for both small and large growers, and backed up with necessary extension and support. Current trends are likely to see continued divergence between small numbers of highly educated, highly sophisticated groups organised through self-help and state support as demonstrated by Australia, Brazil and the US, and less organised and resourced sectors elsewhere.

## **2.7 Strategic Choices**

There are a number of strategic choices facing an initiative seeking to promote a BMP-based approach in the cotton sector.

### **#1 Seek to drive the adoption of BMPs from the supply or demand side?**

As discussed, the key cotton BMPs for pest and water management are win-wins when applied on an area-wide basis, and are therefore amenable to supply-side drivers. This has been the case in Australia, stimulated also by a political need to demonstrate stewardship of natural resources. Furthermore, the complexity of the cotton value chain and weak end-user demand for 'green' cotton (other than the tiny organic niche) would seem to weigh against a 'pull' for BMPs from the demand-side. However, more research is needed, especially on the end-user demands for quality and the potential for folding BMPs into contracts for quality cotton production. Important next steps are to investigate (1) the success or otherwise of the Indian experiments with contract cotton farming, and (2) the success or otherwise of the Australian BMP ecolabel in establishing a better market position for Australian cotton exports.

### **#2 Whether to engage with the macroeconomic/subsidies debate?**

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This is key. Investment in BMPs in smallholder production such as West Africa will be severely curtailed by price distortions caused by dumping of subsidised produce onto world markets and trade barriers. This is potentially achievable as demonstrated by the position of cotton at the Cancun WTO ministerial, and the financial community could play a catalytic role.

### **#3 Whether to engage with other parallel initiatives?**

The number of existing initiatives where cotton BMPs have been developed into certification systems is extremely limited. Engagement with the Australian programme would be extremely important, to understand the process and lessons learned, and applicability (or otherwise) to smallholder production systems. A broader question is whether the BMPs for apparel manufacturing – such as the anti-sweatshop labels – could be connected to more environmentally and socially sustainable production in the field and ginneries.

### **#4 Whether to take a regional or a global approach?**

Resources should be focused on the hot-spots of mis-management of cotton pest and water management. This is especially important in the transition from state to private control of production and marketing. Central Asia, especially Pakistan and Uzbekistan, is a top priority.

### **#5 Whether to take an area-wide or fully traceable approach?**

A fully traceable BMP system for smallholders over a large area may not be feasible. An area-wide approach, e.g. in which communities and producer organisations contract with ginneries to deliver BMP cotton in return for preferential access to finance and technical service, seems the best way forward, especially when supported by random inspections and spot-checks.

### **#6 Whether to aim for a system that is visible to consumers or only to processors?**

Visibility to processors and apparel brands rather than consumers is the aim in the short and mid term. For brands, this is a form of risk management and CSR rather than a means of product differentiation in the market place.