



**Ministry of the Local  
Administration and Environment  
Damascus, Syria**

**Ministry of Industry  
Damascus, Syria**

# **The Cotton Textile Industry in Syria**

**- An environmental Overview -  
November 2003**

*Prepared by*



Sustainable Business Associates

*With the support of*



## TABLE OF CONTENTS

1. ملخص وتوصيات .....	3
2. SUMMARY AND RECOMMENDATIONS.....	5
2.1 The cotton textile industry in Syria and sustainable development.....	5
2.2 Main stakeholders and their environmental impacts .....	5
2.3 Main recommendations to achieve an environmental friendly cotton textile industry..	6
3. INTRODUCTION.....	8
4. BACKGROUND ON THE TEXTILE INDUSTRY IN SYRIA.....	9
4.1 General .....	9
4.2 Information on Cotton Textile Industry in Syria .....	9
5. STAKEHOLDERS IN THE COTTON TEXTILE INDUSTRY.....	14
5.1 General .....	14
5.2 Classification and Responsibilities of Stakeholders .....	14
6. ENVIRONMENTAL IMPACTS OF THE COTTON INDUSTRY IN SYRIA.....	17
6.1 General .....	17
6.2 Identification of the Environmental Impacts of Stakeholders' Activities .....	17
7. CONCLUSIONS .....	21
8. RECOMMENDATIONS .....	22
9. ANNEXES .....	24
9.1 Stakeholders .....	24
9.2 Survey of Key Stakeholders on the Cotton Textile Industry in Syria.....	28

*Prepared by:*

**Sustainable Business Associates (SBA)**

Ch. du Petit-Flon 60

CH -1018 Lausanne

Tel. : + 41 21 648 48 84

Fax. : + 41 21 648 48 85

e-mail : sba@planet.ch

## 1. ملخص وتوصيات

في إطار برنامج DELTA وبدعم من المنظمة السويسرية للتنمية والتعاون (SDC)، أعد مركز الأعمال المستدامة (SBA)، في الفترة ما بين كانون الثاني 2002 وتموز 2003، تقريراً حول صناعة المنسوجات القطنية في سوريا متضمناً كافة المراحل بدء من زراعة القطن إلى تصنيع وتوزيع المنسوجات القطنية. يحاول هذا التقرير إظهار واقع التحديات البيئية التي تواجهها صناعة المنسوجات القطنية السورية. كما ويهدف للتأكيد على أهمية الحوار المتعدد بين جميع الأطراف المعنية مما سيشجع العمل المشترك لاغتنام الفرص وتحقيق الشروط البيئية والعمل على مبدأ "الربح للجميع".

### 1. صناعة المنسوجات القطنية السورية والتنمية المستدامة

تعتبر صناعة المنسوجات القطنية ثاني أكبر مصدر لجلب العملات الأجنبية في الاقتصاد السوري بعد النفط. كما ويعتبر أهم قطاع صناعي من حيث قيمة الإنتاج وتوفير فرص العمل. يساهم هذا القطاع بحوالي 5.4% من العائدات الكلية للصادرات و 20% من عائدات كافة الصادرات السورية، باستثناء النفط. في عام 2001، ساهم القطن الخام (المحلول غير الممشط أو المسرح) بما يزيد عن 70% من عائدات تصدير صناعات المنسوجات القطنية. تنتج سوريا ما معدلة 7% من الإنتاج العالمي للقطن، مقابل 18% للولايات المتحدة الأمريكية.

يتعين أن تتم دراسة هذه الصناعة من وجهة نظر التنمية المستدامة، لما لها من آثار بيئية واجتماعية واقتصادية متعددة، أهمها:

1. الأثر البيئي: استنزاف المياه (في عام 2001 تم استهلاك 4 بليون متر مكعب من المياه في زراعة القطن) بالإضافة لاستخدام المبيدات الكيماوية التي تتسبب بتلف التربة.
2. الأثر الاجتماعي: يعمل في زراعة القطن ما يزيد عن 300,000 شخص كعمال موسميين وأكثر من 25,000 شخص في صناعة المنسوجات القطنية في القطاع العام. تقدر أجورهم بحوالي 3,167 مليون ليرة سورية.
3. الأثر الاقتصادي: تصدير القطن (سواء الخام أو المصنع) يعتبر إستراتيجياً كونه يشكل المصدر الثاني لجلب العملات الأجنبية بعد النفط. يقدر بما يزيد عن 13 بليون ليرة سورية.

قطاع صناعة النسيج في سوريا موزع على كل من القطاعين العام والخاص حيث يلعب القطاع الخاص دوراً حيوياً في إنتاج النسيج في مراحله الأخيرة. صناعة النسيج السورية تحتوي على عدد من نقاط القوة والضعف. تتضمن نقاط القوة وجود مصدر مستقر من المواد الأولية ورخص الأيدي العاملة، وتراكم الخبرات الفنية وشبكة طرق جيدة مع الاستقرار الاجتماعي. وأما نقاط الضعف فتتمركز في قدم البنية التحتية للصناعة مع ضعف الخبرات ونظام تقيد الأسعار وضعف إجراءات التأمينات المالية والموارد المالية المحدودة وارتفاع الضرائب والنقص العام بالمعلومات. بالإضافة لافتقار وجود بنية تحتية ملائمة تساعد على تطوير الصناعات النسيجية لينتم تصديرها مصنعة والذي سيؤدي لجلب المزيد من العملات الأجنبية.

### 2. الهيئات ذات الصلة المباشرة وآثارها البيئية

يوجد 19 هيئة ذات صلة مباشرة بصناعة المنسوجات القطنية السورية. لكل هيئة مهام محددة قد تتداخل وتتربط مع هيئات أخرى في بعض الأحيان. ويوجد 5 هيئات رئيسية مرتبطة بخمس مراحل أساسية من مراحل تصنيع المنتجات القطنية وهي:

- مجلس القطن المعني بوضع السياسات
- اتحاد الفلاحين المعني بزراعة القطن
- المؤسسة العامة لحلج وتسويق القطن المعنية بحلج القطن
- المؤسسة العامة للصناعات النسيجية وشركات النسيج الخاصة وهي المعنية بصناعة القطن
- موزعي المنتجات المصنعة محلياً وهم يتكفلون بالبيع والتوزيع

وقد أظهرت نتائج المحادثات التي أجريت مع ممثلي هذه الهيئات بأنهم يعون الآثار البيئية التي تترتب عن صناعة المنسوجات القطنية ولكنهم لا يدركون قيمة التلّف الحقيقي البيئي الناجم عن نشاطاتهم، كما وأن القوانين التشريعية والالتزام بها لا يعطيهم الحوافز الكافية للحد من الآثار السلبية على البيئة أو إيقافهم عن العمل مع وقف وأفعال نشاطاتهم الملوثة للبيئة.

أهم الآثار البيئية المترتبة عن صناعة المنسوجات القطنية في سوريا هي تلك الناجمة عن: المياه الصناعية العادمة وتلوث التربة والنفايات واستنزاف الموارد غير المتجددة وبشكل أساسي استهلاك كميات كبيرة من المياه. حيث تتطلب صناعة النسيج كميات كبيرة من المياه بدءاً من الري وانتهاءً بعمليات الحنج والصباغة. الاستعمال المفرط للمبيدات والمياه الصناعية العادمة يؤدي بشكل أساسي لتدهور نوعية التربة.

### 3. أهم التوصيات لتحقيق صناعة منسوجات قطنية صديقة للبيئة

لا بد من اتخاذ عدد من الخطوات المهمة على عدة مستويات مختلفة لبلوغ نشاط صناعي مستدام، مع ضمان حماية البيئة على المستوى الوطني (النظام الشامل) وعلى مستوى المنشآت الصناعية. هنالك توصيات تخص كل المستويات وأهمها:

#### • المستوى الوطني:

- من الناحية المؤسسية: تقوية وتطوير مستوى التنسيق ما بين كافة الجهات المعنية مع إيجاد وضع يتضمن الربح للجميع وذلك لإفساح مجال المشاركة لجميع الجهات المعنية بإدارة قطاع النسيج القطني ( في كافة مراحل التصنيع).
- من الناحية القانونية: وضع أطر تشريعية متكاملة وملزمة، مع العمل على تنسيق القوانين على المستوى الداخلي.
- من الناحية الاقتصادية: العمل على دمج مبادئ الإدارة البيئية والتنمية المستدامة في السياسات والخطط والبرامج الاقتصادية. كما يستوجب استخدام أدوات اقتصادية لتشجيع العمل وفق أفضل الممارسات البيئية في كافة المراحل الإنتاجية، وإدخال مقاييس مثل "علامة التصنيف البيئية" (Eco-Labeling) و الأيزو (ISO) وذلك لبلوغ اعتراف دولي للمنتجات السورية. تنمية القطاعات المالية وذلك من خلال إيجاد نظام مصرفي ينسجم مع متطلبات السوق.
- من الناحية الاجتماعية: التركيز على وعي المجتمع المدني، مع تطوير جمعيات المستهلكين والجهات المعنية، ومشاركة المجتمع المدني والقطاع الخاص في صياغة السياسات.

#### • على مستوى المنشآت الاقتصادية:

- كخطوة أولى يجب تحقيق ممارسات بيئية وتقنية وتسويقية واجتماعية جيدة.
- انتقال مرحلي على مدى فترة من الزمن لطرق وعمليات الإنتاج المستدامة.
- تطبيق واعى للقيم البيئية بهدف لتشجيع الوعي البيئي.
- تشجيع الإبداع وحس الابتكار لدى جميع العاملين وعلى كافة المستويات بدءاً من الإدارة إلى العمال العاديين.
- النهوض بالبنية التحتية للإنتاج وذلك لضمان دخل إضافي ناتج عن القيمة المضافة.

## 2. SUMMARY AND RECOMMENDATIONS

In the framework of the DELTA Programme, and with the support of the Swiss Agency for Development and Cooperation (SDC), Sustainable Business Associates (SBA) developed, between January 2002 and July 2003, a report on the cotton textile industry in Syria, from cultivation, to manufacturing and distribution. This report tries to reflect as much as possible the environmental challenges of the cotton textile industry in Syria. Its objective is to show the importance of a multidisciplinary dialogue between actors, thus encouraging joint actions to face environmental opportunities and constraints, and ultimately choose “win-win” options.

### 2.1 The cotton textile industry in Syria and sustainable development

Cotton textile industry provides, after oil, the second largest source of foreign currency to the Syrian economy. It is the dominant branch in industry from the viewpoint of production value and employment in Syria. The textile sector contributes about 5.4 percent of the total export revenue, and 20 percent of the revenue of all Syrian exports, excluding oil. In 2001, raw cotton (ginned but not carded or combed) contributed to over 70 percent of the export revenue generated by the cotton textile industry. Syria's share in the world's total cotton production is about 7 percent. In comparison, the United States produces about 18 percent of the world's cotton.

Cotton textile industry in Syria should be regarded from a perspective of sustainable development, as it results in the following environmental, social and economic impacts:

- a. *Environmental*: overuse of water (4 billion m<sup>3</sup> for cultivation for the year 2001), and soil degradation due to pesticides
- b. *Social*: over 300'000 persons are involved in cotton cultivation as seasonal workers and, in the public sector, over 25'000 people are working in the cotton textile manufacturing with a total of paid wages 3'167 million Syrian pounds
- c. *Economical*: export of cotton (raw and manufactured) is a strategic crop for Syria generating the second largest foreign income after oil with over SYP 13 billion.

In Syria, the textile industry is divided between the public sector and the private sector, which plays an important role in the production of textiles downstream. The **strong points** of the Syrian textile industry include stable supply of raw materials, cheap labour cost, technical accumulation and know-how, good road transportation network, and social stability.

The **weak points** include old industrial infrastructure, inadequate working practices, a restrictive pricing system, weak credit practices, limited financial resources, high tax burden, and general lack of information. Furthermore, the Syrian textile industry stems from the fact that the country lacks the necessary infrastructure for the textile industry to focus on final product exports. The consequence is a loss of additional foreign income.

### 2.2 Main stakeholders and their environmental impacts

There are 19 principal stakeholders involved in the cotton textile industry in Syria. They all have specific tasks that are interrelated. 5 of them are key stakeholders in the 5 key stages of the cotton chain:

- Cotton Congress for *policy making*
- Farmers' union for *cotton cultivation*
- Cotton ginning and marketing organisation for *cotton ginning*
- General Organisation for Textile Industry and private textile companies *for the cotton manufacturing*
- and local private finished products distributors *for sale and distribution*.

Interviews with the stakeholders showed that they have an intellectual grasp of the environmental impacts of the Syrian textile industry. However, the impact of their activities and the subsequent environmental degradation is not recognised at its real value. Furthermore, the legal framework as well as its enforcement does not provide enough incentives or constraints for mitigating those impacts.

The main environmental impacts generated by the cotton textile industry in Syria are aqueous effluents, contaminated land, waste generation, and overuse of non-renewable resources. Mainly, there is an overuse of water. Textile production requires a huge amount of water for the irrigation first, and then for the ginning and dyeing processes. Also, the impact on soil is high. Its degradation is mainly due to the overuse of pesticides and also the aqueous effluents.

### **2.3 Main recommendations to achieve an environmental friendly cotton textile industry**

To ensure sustainable industrial activity as well as environmental protection, several actions should be undertaken at different levels: on the national level (the entire system) and on the level of industrial facilities. Recommendations are proposed for each level and the main are:

- **on the national level**
  - *Institutional*: Enhancing and strengthening the level of coordination between all relevant stakeholders; creating a win-win situation through involving all stakeholders efficiently in the management of the cotton textile sector in Syria (along the cotton chain).
  - *Legal*: Setting a comprehensive legal framework and enforcing it; harmonising laws on the national level.
  - *Economic*: Integrating concepts of environmental management and sustainable development into economic strategies, plans, and programmes; use of economic instruments to encourage the application of the best environmental practices along all stages of the cotton textile chain; introduce measures such as eco-labelling and ISO to achieve international recognition; enhance financing mechanisms through introducing a banking system that is adapted to market mechanisms.
  - *Social*: Enhancing awareness of the civil society; development of consumer and interest groups; involving the civil society and private sector in policy formulation.

- **on the level of industrial facilities**

- Achieving good environmental, technological, marketing and social practice as a first step.
- Staging changes over time towards sustainable approaches and operations.
- Consciously applying values in order to enhance the environmental awareness.
- Promoting an attitude of innovation amongst all levels of workforce starting from the management to the ordinary worker.
- Enhancing the textile manufacturing infrastructure so that an additional value added is generated.

### 3. INTRODUCTION

In the framework of the DELTA Programme, and with the support of the Swiss Agency for Development and Cooperation (SDC), Sustainable Business Associates (SBA) developed a case study for the cotton textile supply chain in Syria from cultivation, to manufacturing and distribution. The case study will serve as a learning tool, which will be used in the various DELTA countries with the objective of showing the importance of a multidisciplinary dialogue between actors, and thus encouraging joint actions to face environmental opportunities and constraints, and choose “win-win” options.

Background information on the textile industry in Syria was gathered and the different actors in the cotton textile sector were identified. Activities and impacts of different stakeholders were listed based on ISO 14001 specifications and interviews of selected stakeholders were accomplished in order to determine their environmental concerns.

This report tries to reflect as much as possible the environmental challenges of the cotton textile industry in Syria. This environmental overview was done between January 2002 and July 2003, under the direction of Karim Zein, President of SBA, in close collaboration with DELTA Syria (the Ministry of the local administration and Environment) and with the active participation of Dr. Mohammed Kayyal, Professor at the Faculty of Civil Engineering at Damascus University, and Ms Rawaa Al-Saadi.

## 4. BACKGROUND ON THE TEXTILE INDUSTRY IN SYRIA

### 4.1 General

In this section, general information on the cotton textile industry in Syria is presented based on data provided in the Statistical Abstract for the year 2002<sup>1</sup>. These include data on quantities, value and export revenue from the cotton and textile industry, in addition to general information on the characteristics of the Syrian cotton textile industry, management issues, and strengths and weaknesses of the industry.

### 4.2 Information on Cotton Textile Industry in Syria

Cotton textile industry provides, after oil, the second largest source of foreign currency (to the Syrian economy). Table 2.1 summarises export quantities and export revenues for the year 2001 for the cotton textile industry and provides comparison with the oil revenue as a percentage of total revenues for Syria. The cotton textile industry contributes about 5.4 percent of the total export revenue, and 20 percent of the revenue of all Syrian exports, excluding oil. Exported ginned raw cotton not carded or combed contributed to over 70 percent of the total revenue from the total export revenue of the cotton textile industry, or the equivalent of 3.9 percent of the total export revenue of Syria for the year 2001. Syria's share in the world's total cotton production is about 7 percent. In comparison, the United States produces about 18 percent of the world's cotton.

**Table 2.1: Export quantities and export revenues for the year 2001<sup>1</sup>**

Export Item	Export revenue in million Syrian pounds in 2001	Percentage of revenue of total Syrian exports in 2001
<i>Oil Exports</i>	168,995	69.5
<i>All Cotton-Related Textile Exports<sup>2</sup></i>	13,154	5.4
<i>Raw cotton not carded or combed</i>	9,391	3.9
<i>All other Syrian exports</i>	61,000	25.1
<b>Total Revenue from all Syrian Exports</b>	<b>243,149</b>	<b>100.0</b>

Table 2.2 provides details on the quantities and values generated by the cotton sector in Syria as well as their contribution to the Gross Domestic Product (year 2001). It should be noted that the revenue consists of the amounts injected into the Syrian economy, excluding export revenue, which is summarised in Table 2.1.

<sup>1</sup> "Statistical Abstract 2002". Central Bureau of Statistics, Syrian Arab Republic.

<sup>2</sup> This includes ginned cotton, cotton waste, cotton yarns, cotton linters, and cotton garments

**Table 2.2** Quantities and values of the cotton sector in Syria for the year 2001<sup>1</sup>

Manufactured Item	Quantity in 2001 (tonnes)	Value in million Syrian pounds	Percentage of GDP in 2001 <sup>*</sup>
<b>1. Raw Cotton</b>	<b>1'009'800</b>	<b>28'173<sup>‡</sup></b>	<b>2.97</b>
<b>2. Ginned Cotton (total)</b>	<b>356'493</b>	<b>19'240</b>	<b>2.03</b>
- Local market (ginned cotton)	130'288	9120	
- Export market (ginned cotton)	187'069	9391	
- Export market (cotton waste)	3'646	101	
- Export market (cotton linters)	35'490	628	
<b>3. Cotton Yarn (total)</b>	<b>82'975</b>	<b>7'831</b>	<b>0.83</b>
- Local market (cotton yarn)	49'842	5'483 <sup>♦</sup>	
- Export market (cotton yarn)	33'133	2'348	
<b>4. Cotton Fabric (total)</b>	<b>22'845</b>	<b>NA</b>	-
- Public sector (cotton fabric)	12'445	NA	
- Private sector (cotton fabric)	10'400 <sup>†</sup>	NA	
<b>5. Cotton Garments (total)</b>	-	<b>13'271</b>	<b>1.40</b>
- Public sector (underwear)	783'000 pieces	552	0.06
- Public sector (ready-wear)	1'045'000 pieces		
- Private sector (underwear)	5'836'000 pieces	12'033 <sup>**</sup>	1.27
- Private sector (ready-wear)	34'013'000 pieces		
- Export of cotton garments	3'197 tonnes	686	0.07
<b>Total</b>	-	<b>68'515</b>	<b>7.23</b>

As can be inferred from Table 2.2, which is presented in a sequence of a flow chart, the cotton sector goes through five stages as described below:

2. Raw cotton is purchased by state establishments. Private farmers and cooperatives are the main producers in agriculture;
3. Raw cotton is ginned in public-sector plants. Cotton ginning is performed for seed separation of raw cotton. This process is restricted to government establishments, which consist of 16 plants that operate 113 saw-toothed ginning wheels, 23 presses and 946 mills. The ginning capacity in Syria has been expanded from 467'000 tonnes to 692'000 tonnes in 1996 in order to reduce stock piling of raw cotton, which is a major cause of poor quality. It should be noted that two third of the cotton raw weight is lost after ginning due to the presence of cotton seeds, which are used to manufacture oil;

<sup>1</sup> "Statistical Abstract 2002". Central Bureau of Statistics, Syrian Arab Republic.

\* Gross Domestic Product (GDP) of Syria in 2001 : 947'808 million Syrian pounds

<sup>‡</sup> Value estimated based on purchase price by state establishments for 2001 at 27.9 SYP/kg cotton

<sup>♦</sup> Value estimated based on average sale value by state establishments to local manufacturers of 110 SYP/kg of cotton yarn (price ranges from 90 to 140 SYP/kg depending on yarn count number)

<sup>†</sup> Quantity extrapolated from data up to year 2000 due to lack of data for the year 2001

<sup>\*\*</sup> Amount estimated based on reported amount and number of garments for the public sector

4. Ginned cotton is converted to cotton yarn in state establishments. The Syrian government currently bans imports of cotton, spun yarns, cotton fabrics, and other products to protect cotton farmers and state-owned textile companies. Also, private companies are restricted from entry into cotton-spinning processes to produce cotton yarn. The government offers restricted licenses to private companies that can handle integrated processes of spinning, weaving, and dyeing. In some plants, cotton yarn may be dyed before producing cotton fabric;
5. Cotton yarn is sold to public and private manufacturing plants, which produce cotton fabric for the local market. Again, in some plants, cotton fabric undergoes dyeing and finishing processes prior to producing cotton garments;
6. Bleach of dyed cotton fabric is cut and sewed to produce a variety of cotton garments ranging from cotton shirts to cotton clothing, socks, head covers, etc.

The following information describes specific aspects related to the **cotton agricultural sector** in Syria:

- Over 300'000 persons are involved in cotton cultivation as seasonal workers
- The yield per unit of cultivation area in Syria has already reached world-class levels at 3.9 tonnes per hectare (for the year 2001). The total cultivated area with cotton in the year 2001 was about 257'100 hectares<sup>1</sup>.
- Cotton varieties produced in Syria include types classified as high quality cotton, which can be used to produce fine fibres for use in high-grade spun yarns.
- Syrian raw cotton prices are typically similar to, or higher than, cotton produced in neighbouring countries such as Turkey, Greece and Pakistan; a tribute to its high quality. Cotton produced in Syria is mainly purchased by the government and sold to state-owned cotton mills or exported.

The following information describes specific aspects related to the **cotton textile-manufacturing sector** in Syria:

- Textile is the dominant branch in industry from the viewpoint of production value and employment in Syria. In 2001, the number of persons employed by the industrial public sector in textile and yarn production (excluding factories manufacturing garments) was about 25'669 which received in paid wages a total of 3'167 million Syrian pounds (SYP). The average of annual salary (123'378 SYP) is 2 times the average per capita domestic product (about 50'240 SYP in 2001).
- The textile industry is divided between the public sector, and the private sector which plays an important role in the production of textiles downstream. Textiles manufacturing was public oriented up to 1985; however, the private sector already surpassed the public sector in production and in employees in 1995.
- The production of textile fabric in 2001 (see table 2.2) reached 22'845 tonnes: 42% of which is from the private sector<sup>2</sup>. Generally, in spinning, state-owned companies represent the major portion of production, while private companies account for much larger portion in the subsequent processes.

---

<sup>1</sup> Statistical Abstract 2002". Central Bureau of Statistics, Syrian Arab Republic.

<sup>2</sup> Ibid

- Exports of cotton clothing using Syrian cotton are on the increase. There are no accurate numbers on the sales made by the private sector of cotton clothing, however, it can be estimated that their market share is more than 20 times that of the public sector, as can be inferred from the data in Table 2.2. Based on these data, it can be also estimated that around 18% of manufactured textile products are exported<sup>1</sup>.

From a **management** point of view, the following information provides an insight on the subject in relation to private and publicly owned companies:

- Public companies are today suffering from declining income. This is due to poor management practices, old equipment, out-of-date technology, poor working practices, insufficient marketing efforts, poor resource allocation, and current institutional conditions imposed on public companies, especially that related to employment and wages, accounting and procurement. The problem with public companies is that their main concern is quantity rather than quality. Furthermore, there is a large variation in performance among state-owned companies. In fact, cotton yarn was sold to external markets at 70 SYP/kg (refer to Table 2.2), which is 40 SYP/kg less than the prices paid by local manufacturers (who are obliged to purchase from the government): a clear indicator of the low product quality, which is manufactured by public establishments. It should also be noted that the price of yarn on the international market is closer to the price paid by local manufacturers.
- The government has not established an appropriate incentive system of private textile businesses. Some private textile companies are enjoying windfall profits from tax savings on garments produced in plants established under investment law No.10<sup>2</sup>.
- Private companies are generally managed under a quality-comes-first policy; most major textile companies that produce cotton garments are certified ISO 9001, the international standard for quality management systems. The main reason for registering for this standard is to open new export markets, which currently include the European Union, the United States and neighbouring countries.
- The private sector is self-financed by collecting resources from owners' relatives. The scarce availability of finance (due to a bank system that is not adapted to the market mechanism) is the real restrictive factor for investment activity at both public and private companies, and impedes introduction of new technology or improvement of design and quality.

Concerning the points of **strengths and weaknesses** of the Syrian textile industry, the following points summarise some of these aspects:

- The strong points of the Syrian textile industry include stable supply of raw materials, cheap labour cost, technical accumulation, good road transportation network, and social stability.
- The weak points include inefficient working practices, a restrictive pricing system, poor credit practices, limited financial resources, high tax burden, and general lack of information.
- Another major weak point for the Syrian textile industry stems from the fact that the country lacks the necessary infrastructure for the textile industry to focus on final product

<sup>1</sup> Number estimated based on quantity of fabric. With a scrap ratio of 20%, and a known export quantity, the quantity consumed locally can be estimated at 17'247 tonnes, which represents over five times the exported quantity of 3'197 tonnes.

<sup>2</sup> Investment Law No. 10 allows the private sector to operate for specific periods of time during which it is not taxed for its profits

exports. Most major cotton producing countries in the world export and import cotton and cotton products concurrently. They can be classified into two groups, (1) countries with high labour cost and high ratio of exports in the form of raw cotton, and (2) countries with low labour cost and high ratio of exports in the form of cotton products. The first group includes the United States, Australia and the former USSR countries. The second group includes China, Pakistan, India, Egypt, Brazil and Turkey<sup>1</sup>. Syria (and Argentina) is an exception to this classification system due to its low labour cost, and low ratio of exports in the form of raw cotton (over 70 percent of cotton is exported raw not carded or combed). This signifies that there is a potential for expanding the cotton products base significantly if Syria establishes a well-coordinated development plan executed to increase the value added of the textile industry while addressing issues impeding local production.

---

<sup>1</sup> "Study on Development of the Textile Industry in the Syrian Arab Republic", Japanese International Cooperation Agency (JICA), March, 1998.

## **5. Stakeholders in the Cotton Textile Industry**

### **5.1 General**

In this section, stakeholders involved in the textile industry are classified based on their contribution to policy setting, cotton cultivation, cotton ginning, textile manufacturing, and retail sales, the 5 main stages in the cotton sector. Responsibilities of stakeholders with negative impacts on the environment are also presented. A wider description of the authorities and organisations, their roles and responsibilities is presented in the annexes (section 6.2).

- State planning Commission
- Ministry of Economic and Foreign Trade
- Ministry of Finance
- Ministry of Agriculture
- Ministry of Industry
- Ministry of Irrigation
- Cotton Congress
- Cotton Bureau
- Organisation for the Development of Cotton Seeds
- General Organisation for Agricultural Mechanisation
- Farmers' Union
- SASMO
- Ministry of Environment
- Cotton Ginning and Marketing Organisation
- GOTI and private textile companies
- Chamber of Industry
- Ministry of supply and home trade
- SANDUS
- Local private products distributors
- Foreign finished products distributors

### **5.2 Classification and Responsibilities of Stakeholders**

Many ministries/authorities and organisations are involved in the textile industry in five key stages of the cotton sector. These are:

- Policy-making
- Cultivation
- Ginning
- Manufacturing and transportation
- Sale and final use

In the following Table 3.1, the various stakeholders are classified based on their involvement(s) and responsibilities in one or more of the above five stages. A ranking system of 1 to 4 has been devised to illustrate the importance of their respective involvement and weight, with '1' being the most important classification.

**Table 3.1: Classification, Responsibilities and Activities of Stakeholders in the Cotton Chain**

Name of Stakeholder	Classification					Responsibilities of Stakeholder
	Policy-making	Cultivation	Ginning	Manufacturing, transportation	Sale and final use	
State planning Commission	3					Approval of textile industry development plans
Ministry of Economic and Foreign Trade	4					Monetary policy and banking
Ministry of Finance	4					Taxes, fees and subsidies
Ministry of Agriculture	2					- Implements policies set by cotton congress - Sets cotton seed and raw cotton prices
Ministry of Industry	4					Supporting function for industrial development
Ministry of Irrigation	2					Water resource management for use in agriculture
Cotton Congress	1					Sets cotton policy for each season
Cotton Bureau	1	1				Decides the planting season, and development of new cotton crops
Organisation for the Development of Cotton Seeds		1				Plays an important role in the improvement of yield and upgrading the quality of Syrian cotton
General Organisation for Agricultural Mechanisation		3				Mechanisation for production of raw cotton
Farmers' Union		1				Guidance and awareness to farmers on cultivation practices
SASMO		4		4		Approves the specifications of imported materials and agricultural and manufacturing materials
Ministry of Environment		4	4	4		Promotes clean production practices in agriculture and industry
Cotton Ginning and Marketing Organisation			1			Buying seed cotton, ginning, grading, storing, selling, marketing, and distribution of raw cotton and cotton waste

**Table 3.1** (continued)

Name of Stakeholder	Classification					Responsibilities of Stakeholder
	Policy making	Cultivation	Ginning	Manufacturing, transportation	Sale and final use	
GOTI and private textile companies				1		Production activities after ginning including weaving, spinning, dyeing, and fabric finishing, sewing, packaging and transport of finished product
Chamber of Industry				4		Establishes communication channels between government and private industry and provides awareness and training to industrial sector on proper manufacturing practices
Ministry of supply and home trade					3	Pricing of textile products in the national market
SANDUS					2	Distribution of textile products locally in the national market
Local private products distributors					1	Distribution of textile products locally in the national market
Foreign finished products distributors					1	Distribution of textile products externally in the international market

Based on the foregoing, five key stakeholders can be assigned to the five key stages of the cotton chain. These are listed in Table 3.2 below:

**Table 3.2:** Key stakeholders in the Cotton Sector

Stage in the cotton sector	Key stakeholders
Policy making	Cotton Congress
Cotton Cultivation	Farmers' Union
Cotton Ginning	Cotton Ginning and Marketing Organisation
Cotton Manufacturing	GOTI and private textile companies
Sale and Distribution	Local private finished products distributors

## 6. Environmental Impacts of the Cotton Industry in Syria

### 6.1 General

In this section, environmental impacts of activities undertaken by the key stakeholders identified in Table 3.2 from the previous section are evaluated. The list of impacts presented below is based on the requirements of the ISO 14'001 environmental management system standard and follow also the environmental domains set by the World Bank for more sustainability. The impacts can be classified as follows:

1. **Air emissions:** Degradation of the quality of air occurs as a result of emissions of gases and particulates in the atmosphere.
2. **Aqueous effluents:** Deterioration of water quality, whether surface or groundwater, occurs due to the discharge of contaminants in these water bodies from various industrial processes.
3. **Contaminated land:** Degradation of soil quality occurs due to the leakage or spilling of chemicals that come into contact with the ground, resulting in soil contamination.
4. **Waste generation:** Various activities may result in the generation of waste, which cannot be disposed off readily. This creates a negative impact on the environment.
5. **Use of non-renewable resources:** Many of the resources available on our planet are being used at a faster rate than the natural re-generation rate. This includes petroleum hydrocarbons, water, etc. The non-sustainable use of these resources creates a negative impact on the environment.
6. **Other impacts:** These include noise, visual impacts, etc.

### 6.2 Identification of the Environmental Impacts of Stakeholders' Activities

#### 6.2.1 *Environmental impacts in the cotton textile industry*

Based on the responsibilities identified in Table 3.1, the following impacts listed in Table 4.1 are identified for each of the key stakeholders included in Table 3.2. As can be seen, some of these activities include multiple impacts. Again, a ranking system of 1 to 4 has been devised to illustrate the importance of their respective impact(s), with '1' being the most significant.

Based on the information included in Table 4.1, the following summary may be obtained on the impacts ranked '1':

- **Aqueous effluents:**

The main organisation causing this impact is the private and publicly owned textile manufacturing companies

- **Contaminated land:**

The main organisation causing this impact is the farmers' union.

- **Waste generation**

The main organisation causing this impact is the cotton ginning and marketing organisation.

- **Use of non-renewable resources**

The main organisations causing this impact are the cotton congress, the farmers' union and the private and publicly owned textile manufacturing companies.

### **6.2.2 Description of the impacts per stakeholder**

#### **The cotton congress**

- The cotton congress sets the cotton policy each season concerning quantity and type of cotton to be cultivated.
- The major environmental impact resulting from its decisions is the depletion of non-renewable natural resources. These include land degradation and use of water, either surface or groundwater.
- This environmental impact will ultimately affect society when water is depleted and land is no longer suitable for agriculture, becoming in the long term a socio-economic impact on communities depending on these resources.

#### **The Farmers' Union**

- The Farmers' Union provides guidance and awareness to farmers on water irrigation methods, which influence the consumption of non-renewable water resources; and on type and method of application of fertilisers and pesticides, which results in land contamination.
- These environmental impacts will ultimately affect society when water is depleted and land is no longer suitable for agriculture, becoming in the long term a socio-economic impact on communities depending on these resources.

#### **The Cotton Ginning and Marketing Organisation**

- The major environmental impacts resulting from the role of the Cotton Ginning and Marketing Organisation is the depletion of water and generation of waste. Raw cotton requires the use of water in the ginning process, ultimately resulting in contaminated water effluent. Poor storage conditions of ginned cotton result in the generation of cotton waste.
- Depletion of the water resource has an economic cost to society, which depends on water for its survival. Depletion of the water resource occurs not only when used in the ginning process, but also when contaminated water becomes in contact with clean water. In addition, water is indirectly depleted when it is used in the ginning process only to become later on waste due to poor storage conditions.

#### **The cotton products manufacturing**

The cotton products manufacturing industry is divided into public and private sectors. Cotton products include yarn, fabric, and finished product. The processes involved include spinning, knitting, weaving, dyeing, sewing, printing, and finishing.

- The major environmental impacts from the textile manufacturing companies can be ranked in the order of contaminated aqueous effluents and water resource usage (where dyeing is undertaken), air emissions (from boilers and generators), waste generation (from all industrial activities), and land contamination (by chemicals and used fuel oil).

- Depletion of water resources in terms of usage and contamination has an economic cost to society, which depends on water for its survival. Air emissions; result in health impacts that affect the quality of life of members of society. Waste generation and contamination of land result in the reduction of land value, which also result in the decrease of wealth of society.

### ***The cotton products distribution industry***

The cotton products distribution industry is divided into local and foreign. Cotton products consist of finished ready to sell product. The processes involved include packaging of manufactured products and shipping.

- The major environmental impact from the cotton products distribution industry is waste generation (from packaging), in addition to use of energy sources in the transport of the products to their final destination.
- The generation of waste has an economic cost to society, in terms of the deterioration of land value due to the presence of waste. Non-sustainable use of energy resources will also reduce the wealth of society in the long term.

**Table 4.1: Impacts of activities undertaken by the Stakeholders in the Cotton Chain**

Name of Stakeholder	Activity of Stakeholder	Environmental Impacts					
		Air Emissions	Aqueous Contaminated Effluents	Contaminated land	Waste generation	Use of non-renewable resources	Other impacts
Cotton Congress	Sets policy each season concerning: <ul style="list-style-type: none"> <li>- Quantity and quality of cotton to be cultivated, ultimately influencing the use of non-renewable water resources</li> </ul>					1	
Farmers' Union	Provides guidance and awareness to farmers on cultivation practices including: <ul style="list-style-type: none"> <li>- Water irrigation methods which influence the consumption of non-renewable water resources;</li> <li>- Type and method of application of fertilisers and pesticides which impacts land contamination</li> </ul>			1		1	
Cotton Ginning and Marketing Organisation	<ul style="list-style-type: none"> <li>- Ginning raw cotton with use of water in the ginning process and the resulting contaminated water</li> <li>- Storage of cotton, which results in cotton waste due to possible poor storage conditions.</li> </ul>		1		2	1	
GOTI and private textile companies	Production activities after ginning including: <ul style="list-style-type: none"> <li>- Weaving and spinning resulting in the generation of waste</li> <li>- Dyeing and fabric finishing operations resulting in contaminated aqueous effluents, consumption of non-renewable water resources, and air emissions from boilers</li> <li>- Sewing, and packaging of cotton product resulting in waste generation and minor impacts</li> </ul>	3	1	3	3	1	3
Local and foreign finished products distributors	Distribution of ready-to-wear cotton textile products				2	3	

## 7. Conclusions

Based on the foregoing discussions, the following conclusions can be noted:

1. Cotton cultivation in Syria should be regarded from a perspective of sustainable development, as it results in the following environmental, social and economic impacts:
  - a. *Environmental*: overuse of water, and soil degradation due to pesticides
  - b. *Social*: over 300'000 seasonal workers are involved in the cotton cultivation processes up to the point when cotton bales are delivered to the ginning plants.
  - c. *Economical*: cotton is a strategic crop for Syria generating the second largest foreign income after oil.
2. The industrial infrastructure is not developed to handle the large crop size being cultivated. This has negative impacts on the Syrian economy as far as:
  - a. Loss of potential jobs in the industrial sector due to lack of infrastructure.
  - b. Loss of additional foreign income that can be generated from finished products (cotton garments).
  - c. Decrease in the GDP of the country.
3. In order to develop Syrian textile sector, there is a need to upgrade supporting infrastructure such as banking facilities, privatisation (for example for yarn production), and promotion of quality and environmental management standards that enhance products' quality and increase the level of competition of Syrian industry in the international markets.
4. Finally, decision-makers should be able to answer the following questions:
  - a. Do the socio-economic aspects balance the environmental impacts for a sustainable cotton industry in the current conditions?
  - b. For how long can this situation continue before the whole industry becomes unsustainable for the Syrian people?
  - c. Is there an alternative crop that may be considered which offers better socio-economic opportunities while reducing the environmental impacts?

## 8. Recommendations

The problems encountered by the Syrian Textile industry should be handled on two levels:

- on the national level (the entire system),
- and on the level of industrial facilities.

- **Recommendations on the national level**

1. *Institutional*

- Enhance and strengthen the level of coordination between all relevant stakeholders. Coordination should be enhanced both horizontally (among ministries at the national level) and vertically (among the different layers of the government and among the government and other non-governmental stakeholders such as farmers and private textile factories) through setting-up institutional structure and mechanisms for coordination
- Demarcate responsibilities and areas of cooperation amongst all relevant stakeholders and that includes areas related to policy formulation, implementation, monitoring, and enforcement
- Build institutional capacity to undertake tasks and responsibilities assigned
- Create a win-win situation through involving all stakeholders efficiently in the management of the cotton textile sector in Syria (along the cotton chain).

2. *Legal*

- Setting a comprehensive legal framework and enforcing it
- Harmonising laws on the national level, based on the lessons of science, in order to diminish the arbitrariness of the political government and to proceed faster to advanced environmental protection
- Integrating the Environmental Impact Assessment into each textile project planning.

3. *Economic*

- Integrating concepts of environmental management and sustainable development into economic strategies, plans, and programs. This integration will not only be rewarding to the cotton textile sector but also to all other economic sectors.
- Use of economic instruments to encourage the application of the best environmental practices along all stages of the cotton textile chain starting from farmers (to adapt water-saving irrigation techniques) to industrial facilities. These economic instruments may take different modalities.
- Introduce measures such as eco-labelling and ISO to achieve international recognition
- Enhance financing mechanisms through introducing a banking system that is adapted to market mechanism.

#### 4. Social

- Enhancing awareness of the civil society
- Development of consumer and interest groups
- Involving the civil society and private sector in policy formulation by making them part of the national vision for the textile industry and part of the solution to problems created by the textile industry as well.

#### • Recommendations on the level of industrial facilities

Problems associated with the textile industry involve the entire system. However, the following recommendations may also concern a single textile factory (i.e. may act unilaterally). The recommendations below are applicable to industries that are willing to move along with their performance to where their textile industry is sustainable. Recommendations on the level of industrial facilities include:

- Achieving good environmental, technological, marketing and social practice as a first step.
- Staging changes over time. Textile industries are likely to have a foot in both worlds: they will continue to operate in the traditional way, while investing and steadily moving with their operations to the sustainable approaches. The transition to sustainable operations by an individual mill will be a change that occurs progressively over a period of time.
- Consciously applying values. Decisions made to move towards sustainability should be made based on a broad and holistic assessment of the current situation. They should also be value-based and normative so that they can inspire management vision for the future of the factory and tap into powerful personal motivations among their workforce.
- Adapting a systematic perspective where the factory's activities are not seen only in the context of the market but in the context of the whole environmental and socio-economic system. Thus, the production generated will be of a developed quality for exports (with eco-labels, high quality and environmental standards).
- Promoting an attitude of innovation amongst all levels of workforce starting from the management to the ordinary worker.
- Enhancing the textile manufacturing infrastructure so that an additional value added is generated.

## 9. ANNEXES

In this section, a description of the authorities involved in the textile industry and their roles and responsibilities is given.

### 9.1 Stakeholders

Raw cotton cultivation and delivery to the ginning plant are carried out by the private sector; but practically, the government controls it. In principle, all cotton cultivators are requested to obtain a license or a permit by the Ministry of Agriculture and Agrarian Reform. Furthermore, a raw cotton purchase price is announced prior to seed sowing and it is guaranteed throughout the season. The set price of cotton bought by State establishments is 27.90 Syrian pounds per kilogram for the year 2001<sup>1</sup>. Purchasing of seed cotton, production research, ginning, grading, domestic sale, export, distribution of cottonseeds and fertilisers, and finance are handled by governmental agencies. The Syrian textile industry and the administration body for public textile companies represented by the General Organisation for Textile Industries (GOTI) are under the functional control of the following ministries, agencies, offices and organisations:

#### 9.1.1 State Planning Commission (SPC)

- Compiles three types of development plans; long-term frame plans (10-15 years), five-year development plans, and annual plans. The annual plan is the implementation tool for the 5-year plan. Annual plans are compiled by the following procedure. Each public textile company proposes to GOTI its annual plan for the following calendar year in June. GOTI coordinates their annual plans if multiple companies produce the same products. These plans are submitted to the Ministry of Industry and SPC in August.
- Holds a hearing session to discuss and approve these plans.

#### 9.1.2 Ministry of Economy and Foreign Trade

- Deals with issues related to foreign trade
- Conversion rate for foreign exchange
- Monetary policy and banking
- Responsibility for cotton ginning plants due to the fact that over one half of ginned cotton is exported to external markets

#### 9.1.3 Ministry of Supply and Home Trade

- Pricing of textile products for sale within the Syrian market

#### 9.1.4 Ministry of Finance

- Expenditure of fixed capital investment
- Taxation, fees and subsidies

---

<sup>1</sup> Statistical Abstract 2002". Central Bureau of Statistics, Syrian Arab Republic.

### **9.1.5 Ministry of Industry**

- Management of six public undertakings (the largest of which is the General Organisation for Textile Industries)
- Research and analysis of private company activities
- Foreign direct investment in industry
- Supporting function for industrial development

### **9.1.6 Ministry of Agriculture and Agrarian Reform**

- It sets the price of raw cotton and the purchase price by government. Three kinds of prices are set depending on the harvest timing. The peak price is set before mid-November and includes a marginal profit for farmers. After the first of December, the prices tend to decline below the cost prices. This season-dependent pricing system encourages early harvests. Early harvest, before the rains, results in better quality because of the low presence of dust. These prices are the purchase price at 500 collection centres of the Cotton Marketing Organisation, and they are applicable to good quality raw cotton. If quality does not reach the necessary standard, the purchased price is discounted.

### **9.1.7 Ministry of Irrigation**

- Determines the quantity of water available for use in agricultural activities

### **9.1.8 Ministry of Environment**

- Promotes clean production practices and sustainable environmental policies in industry and agriculture

### **9.1.9 General Organisation for Textile Industries (GOTI)**

- GOTI is one of the general organisations that combine the public companies in each sector. GOTI depends on the state budget for investment finance. Over 180 persons are employed in eight departments. Each public company is independent of one another and also from the GOTI. The role of GOTI is to supervise and coordinate the related independent public companies in the planning and follow-up of the implementation for production, export, marketing, investment, employment, profit and prices; product guarantee and quality control; and endorsement of annual plans for investment, production, marketing, workforce, return, and estimated budget.
- The legal framework request GOTI to take active leadership among related public companies. However, this idea is not materialised in practice.

### **9.1.10 Cotton Bureau**

- It is located in Aleppo and comes under the jurisdiction of the Ministry of Agriculture.
- Decides the planting season for each cotton field for farmers

#### **9.1.11 Organisation for the Development of Cotton Seeds**

- It is responsible for research and development and research of raw cotton. It plays an important role in the improvement of yield and upgrading the quality of Syrian cotton.

#### **9.1.12 Cotton Congress**

- The Cotton Congress is involved in the cotton chain in the policy-making stage. It consists of the Minister of Agriculture and Agrarian Reform and 100 to 120 officials who hold a congress once a year. It is responsible for determining a cotton policy for the forthcoming year based on a review of production of the previous season and actual results of cotton development.

#### **9.1.13 Cotton Ginning and Marketing Organisation (CMO)**

- This organisation buys seed cotton at gin point, and is responsible for ginning, grading, storing, selling, and marketing raw cotton in the country.
- Distribution of cotton for local usage and exports of cotton to the international market based on the export certificate prepared by the Cotton Bureau.
- Distribution of the cotton waste from the ginning process. High quality waste is sold to Syrian private companies for the manufacture of second grade products, which can be sold locally. Low quality waste is sold to external markets where it is used in cotton by-products.

#### **9.1.14 General Organisation for Agricultural Mechanisation**

- This is a new organisation that has its role in the mechanisation for production of raw cotton and the improvement of its yield with the collaboration of the Cotton Bureau.

#### **9.1.15 Agricultural Cooperative Bank of Syria**

- The Agricultural Cooperative Bank, having the largest network, provides loans as well as short and medium term credits to the cooperatives and to private farmers.
- It sells cottonseed, fertilisers, insecticides, and bags to farmers and provides them with financing including subsidies for production. It also pays the price of raw cotton to the farmers on behalf of CMO.

#### **9.1.16 The General Organisation for Textile Products (SANDUS)**

- This public-owned company is responsible for the distribution of textile clothing products and garments manufactured by the public sector in Syria. It runs about 95 shops all over Syria, and sells about 552 million Syrian pounds worth of clothing per year.

#### **9.1.17 The Syrian Arab Organisation for Standardisation and Metrology (SASMO)**

- SASMO was established in 1969, under the jurisdiction of the Ministry of Industry for industrial standardisation and technical guidance

- Services available include seminars on standardisation, technical consultation for exporting companies on overseas standards, industrial standards, supply of technical information, technical training courses.
- Approves the specifications of imported raw materials prior to issue of import license.

#### **9.1.18 Chamber of Industry**

- Awareness-raising and training in quality and environmental matters
- Provides assistance to the government by promoting orderly behaviour of the private sector and facilitating policy formulation for industrial development
- Establishes communication channels between the government and the private sector and addresses private sector issues to government as well as issues certificates of origin

#### **9.1.19 Farmers' Union**

- Provides guidance and awareness to farmers on seeding, use of fertilisers, cultivation and irrigation practices

## **9.2 Survey of Key Stakeholders on the Cotton Textile Industry in Syria**

### **9.2.1 General**

Further to the list of key stakeholders in Table 3.2 and their respective impacts in Table 4.1, the following issues were raised to each stakeholder, and accordingly, its answers and concerns were noted. These are presented in the following subsections.

### **9.2.2 Cotton Congress**

**Contribution to the cotton chain:** Policy making

#### **Major impacts**

- Use of non-renewable resource: water depletion and land degradation

#### **Findings**

In response to the question related to the factors that need to be taken into account in the planning of the quantity and type of cotton to be cultivated in order to ensure that the proposed plans do not result in the excessive use of water and that the type of cotton to be cultivated does not result in land degradation, the answer can be summarised as follows:

- **Use of Water:** Quantities of water are allocated before planning of the quantity and type of cotton not the other way around. The Ministry of Irrigation, Ministry of Agriculture, Ministry of Economic (Agricultural Economic Directorate), allocate the quantity of water available for each crop in each of the Syrian Governorates based on the available water storage. Different Governorates have different quantities of water allocated based on the availability of water in that very governorate. This plan is discussed with the Cotton Congress stakeholders and endorsed in the Cotton Conference held in March of every year.

In answer to the question on what would the Cotton Congress suggest to prevent water depletion, the answer was in utilising advanced irrigation methods such as drip water techniques. It is noted however that, so far, only 1.54% (that is 27,575 hectares) of the cotton-cultivated lands is irrigated by drip water irrigation systems.

- **Land Degradation:** Types of fertilisers to be used by farmers are determined each year in the Cotton Conference based on soils analyses. Soil analysis is performed in the Ministry of Agriculture laboratories free of charge to farmers. The Minister of Agriculture endorses the quantities of fertilisers specified each year. The decision-makers, as noted in the interview, are quite aware that using inappropriate irrigation systems does not only deplete water but also result in land degradation and soil desalination.

### **9.2.3 Farmers' Union**

**Contribution to the cotton chain:** Cotton Cultivation

#### **Major impacts**

- Use of non-renewable resource: water depletion and land degradation
- Soil contamination

#### **Findings**

In response to the question as to what is the Farmers' Union doing to assist farmers in reducing the impacts listed above, the response was that the farmers' union provides guidance and awareness through the following:

- Activities related to technical guidance: Seminars and workshops organised together with the relevant entities and which are aimed at providing all information needed to improve the quality of cultivated cotton. In addition, technicians and specialists conduct field visits through which they explain different technical issues to farmers and distribute pamphlets and printed materials that explain the technical information in a simple manner.
- Pilot field projects: In year 2002, the Farmers' Union, in cooperation with the Cotton Bureau, designated 108 pilot field projects which were used to implement the technical recommendations stipulated in the Cotton Conference.
- Media: TV documentaries and interviews with specialists were utilised for the dissemination of technical information on cotton. In March and April 2002, a mobile agricultural theatre travelled to all governorates that produce cotton to demonstrate the recommendations of the Cotton Conference and other technical information. Also, a guide on the agricultural procedures for cotton farming was distributed to all the technicians and specialists working in the relevant Farmers' Union units.
- Training courses for both farmers and agricultural engineers to provide them with the state-of-the-art techniques on cotton cultivation and enhance their skills.
- The Farmers' Union does not however do any awareness related to the environment. Resource usage (water and land) is never the focus of such activities. The main issue of concern is the quantity and quality of the produced cotton crops. There were some efforts to achieve a balance between concerns over the products and those over the environmental issues. But more work is still needed.

In response to the question on how can we place an importance on environment and water related problems and how can we deliver our concerns over those issues to the community of farmers who probably care less for those issues and place the utmost importance on their crops, especially that the Farmers' Union did not shed much light on such problems with the needed attention and focus, the answer was:

- The same tools used currently for awareness-raising with regards to the technical and agricultural aspects could be used to inform the farmers about such problems. Also, because of the media and because more farmers go to colleges today, farmers are more educated about water and environmental problems and thus, reaching out to them and speaking on these issues is very possible. Educating women in the farmers' community about those concerns is one effective way of doing so. The Farmers' Union has already a representative at the Ministry of State for Environmental Affairs (MSEA), but more cooperation is needed between the two entities. The Farmers' Union can envisage the role of the MSEA as a main source of information and materials for the awareness campaigns. With regards to water, the Ministry of Irrigation has already a role in allocating the quantity of water that can be used for cotton farming irrigation. So the Ministry of Irrigation is also a partner in the awareness-raising campaign related to water issues.
- Finally, it is noted that the Farmers' Union is aware of the fact that irrigating cotton crops is a very sensitive issue in a sense that less or more water than required could cause a deterioration in the quality of the produced cotton. Thus, it always follows recommendations from researchers in utilising the required amounts of water. It is stressed that a balance between what is best for the cotton crops and what is best for the environment should be achieved. Careful selection of irrigation methods is an import tool

to achieve that balance. Advanced methods of irrigation are presented to the farmers and the advantages of using such irrigation systems were demonstrated on the explanatory fields so that farmers can see it on the ground.

#### **9.2.4 Cotton Ginning and Marketing Organisation**

**Contribution to the cotton chain:** Cotton ginning

**Major impacts** (listed in order from most to least significant):

- Use of non-renewable resource: water depletion and land degradation
- Aqueous effluents
- Waste generation

**Findings:**

In response to the question on how would the organisation envisage changes in its manufacturing and storage processes to protect water resources from depletion and minimise its waste generation due to poor storage, the answer highlighted the following aspects:

- With regards to water consumption and contamination, the organisation consumes insignificant amounts of water. Water is pumped from tanks as small as 2m<sup>3</sup>. Water usage is limited to wetting the ginned cotton. The desired moisture in the cotton is typically 8-10%. Sprinklers are utilised in ginneries dated as early as 1995, while steam is utilised in modern ginneries. Steamers have proven to be more efficient in terms of water consumption. Future plans include increasing the number of steamers. No wastewater effluent is produced.
- As far as waste generation resulting from poor storage practices is concerned, an economic feasibility study is typically conducted when establishing each ginner. Based on this study, the number and sizes of the storage facilities are determined. This study is very crucial for determining these aspects. At times when additional storage facilities are needed, open areas are used after providing the necessary protection procedures against adverse weather conditions. Those protection procedures include providing covers and isolated floors where car tires are used underneath the product.
- Finally, it is noted that all solid waste is sold to be reused in the manufacture of other products. No waste, which could harm the environment, is dumped.

#### **9.2.5 Cotton Textile Manufacturing (Public and Private Sectors)**

**Contribution to the cotton chain:** Cotton textile manufacturing and transportation

**Major impacts**

- Contaminated aqueous effluents
- Use of non-renewable resource: water depletion and energy usage
- Air emissions
- Soil contamination
- Waste generation
- Other impacts (noise, visual, etc.)

### **Findings:**

In answer to the question as to how would the cotton products manufacturing industry change its practices to:

1. Limit the use of water
2. Reduce the pollutants levels in wastewater effluent
3. Reduce impacts of air emissions on air quality
4. Reduce the solid waste generated
5. Reduce soil contamination
6. Deal with noise and visual effects

The answers varied for some aspects between the public and private sectors. Companies interviewed included GOTI and other private sector companies such as Habi-TEX, etc. They highlighted the following:

- **Use of Water:** Both the public and private sector companies involved in dyeing expressed their concern about the lack of water resources for industrial processes. However, lack of legislation, which requires that companies pay for water, remained the key issue that prevented both from taking concrete actions to reduce water consumption. Both sectors are aware of new technologies that utilise less water in the dyeing process. However, high import taxes imposed by the government on this expensive technology prevent the private sector from investing in such technology. For the public sector, the lack of government policy on the adoption of clean technologies prevents them from pursuing such expensive equipment.
- **Contaminated Effluents:** This was of concern to companies involved in fabric dyeing. For the private sector, the issue is very simple: since legislation has not forced them to treat their wastewater effluents, then they do not have to do so since this is an added cost which makes their product less competitive in the local market. Awareness of the impacts is quite evident; some are willing or have applied some preliminary wastewater treatment, however, none to the required standard such as to protect water resources from contamination. For the public sector, again, management can only plan to treat its wastewater if the government allocates funding for the construction of wastewater treatment plants. Otherwise, their hands are tied, and nothing can be done. Again, this sector is also aware of the negative impact of contaminated water on the environment. Reduction of level of contaminants, which requires the utilisation of expensive raw materials, raises again the same concerns as for clean technology, and hence both sectors will not undertake such measures to protect the environment.
- **Air Emissions:** It is noted that these are typically caused by the fuel oil supplied by the government for operating the boilers and generators. Both sectors claim that as long as the government provides them with a bad quality fuel, rich in sulphur (the government refinery does not operate desulphurisation units due to their high costs), while at the same time monopolises the energy market, then nothing can be done to reduce the air emissions impacts on the environment. Converting to diesel fuel would reduce the concentration of emissions, but the cost is three fold, which would impact the cost of the product significantly. It is noted that if the government provides them with stable supply of electricity, then they would not have to operate their generators, and that would reduce the impact of air emissions to the environment.

- **Generation of Waste:** The private sector notes that Syrian people are very efficient in the reuse and recycling of all generated solid wastes due to their monetary value. Hence, nothing is left that impacts the environment. This includes barrels of dyes and chemicals, which should be incinerated, but unfortunately, workers collect for personal uses against their personal safety. In the public sector, the situation is similar somehow, although government bureaucracy sometimes prohibits the recycling of some waste due to the need for complex administrative procedures to allow these items to go on sale. For that purpose, much of this waste gets collected and dumped around the factory buildings. Generally, for both sectors, there are no waste management systems in place for hazardous waste segregation, disposal and treatment.
- **Contamination of Soil:** Both sectors failed to realise their impact on land and soil, until it was pointed out to them that irregular dumping of solid waste with traces of chemicals or hydrocarbons from handling of chemicals, spills and other irregular uses may result in soil contamination. For both sectors, there are no control procedures to prevent soil from being contaminated. No actions are taken to clean soil and prevent groundwater from being contaminated.
- **Noise and Visual effects:** These issues are of no concern to any of these sectors, although the private sector attempts at times to plant trees inside and around the factory. However, no serious consideration is given to these aspects, especially in the public sector.

### **9.2.6 Cotton Textile Products Distributors**

**Contribution to the cotton chain:** Distribution and sale of cotton products

#### **Major impacts**

- Use of non-renewable resource: energy usage
- Waste generation

#### **Findings**

In answer to the question as to what measures does a public sector company (Waseem) and a private sector company (Stephanel) both of which are involved in the distribution and sales of cotton products regarding the handling of solid waste generated from packaging and saving fuel energy consumed by distribution vehicles, they both gave similar answers as summarised below:

- **Generation of Waste:** Solid waste generated whether it was pieces of cloth or papers and plastics used in packaging are sold for reuse and recycling. In the public sector, the waste gets collected and then sold after completing some administrative procedures. No waste is disposed where some money can be made from reuse and recycling.
- **Energy Usage:** This is related to the use of gasoline for the distribution vehicles. In both sectors, this is monitored strictly by management due to the high costs of gasoline in Syria. The numbers of trips are planned based on a strict weekly schedule, and the mileage is specified along specific routes to be followed by the drivers. Use on unleaded gasoline is preferred where available. Both companies note that a systematic vehicle route planning, and the purchase of more fuel-efficient vehicles can save some money and result in fuel savings.