Impact of Marketing Mix on Exports of The Egyptian Textiles Using System Dynamics Approach

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ABSTRACT

Egypt was always known as a high quality exporter for raw cotton and cottoned textiles. Egyptian cotton has international known reputation of special features that attract niche market consumers. Under many environmental conditions the exports of Egyptian raw cotton and cottoned textiles decreased, which would result in social and economical problems. The current status of Egyptian textile industry and the coming applications of several global and bilateral trade agreements send strong danger signals to workers through the textile value chain starting by farmers ending with exporters. Matching the competitive advantage with opportunities needs deep knowledge of the industry and the mental model that lays it. Dumping dynamics of virtual system that control the textile industry is becoming an imperative need to find a way out of industry current status, and prepare it for future challenges.

This paper is in quest of building a system dynamics model for Egyptian textile industry, which can be used for testing ideas of change to enhance the status of this industry, prepare it for near expected local and international environmental changes, and mainly to boost the exports of the industry. Moreover, elements of strategies to increase Egyptian textile industry exports are tested to get the best strategy that should be followed to reach the targets.

This paper concluded the high importance of investment in raw cotton development to increase exports of raw cotton and Egyptian finished textile. It showed that the early investment to increase fine raw cotton production is more effective in increasing exports than investment in textile manufacturing development, which would be more important after raw cotton production increase. It showed also that investment in distribution and promotion helps against competition with results better than quality and research and development for the Egyptian textile-manufacturing sector. Also, investment in quality of finished textiles should be sustainable at high levels to give a real positive effect on exports.

Keywords: Textile, Agricultural, Marketing Mix, Developing Countries, System Dynamics.

INTRODUCTION

Textile industry was always the leading industry in Egypt that absorbed many of the Human resources. Egypt has many competitive advantages in this industry due to its finest production of cotton, huge manufacturing facilities, and skilled Human resources. Lately, the Egyptian textile industry has many problems that are accompanied with very difficult internal economic pressures and threats of external worlds. Egyptian textile industry has the opportunities to compete domestically and globally, if it can solve the problems through its value chain.

Egyptian textile industry was and still considered as the most important industry in Egypt because it absorbs 30% of Egyptian workforce, and it presents 25 % of exports. So, Egyptian economy has no choice to reengineer this industry to face the changing environmental variables around it. Marketing Mix, Product, Price, Distribution, and Promotion, should be changed to develop this industry and prepare it to face current and rear future problems. Egypt needs to take informed actions to leverage this industry to and increase exports, so that increase work force and hard currency income. System dynamics tools can help Egypt to change its comparative advantages of its Textile industry to global competitive advantages.

PROBLEM DEFINITION

Lately, Egyptian textile industry, under privatization program, economic pressures, GATT agreement, is trying to get large steps to leverage that it had enjoyed before. The industry is mostly anchoring on the competitiveness of availability of most of value chain steps in Egypt. Starting from row materials, ending with industrial facilities are mostly available in Egypt with considerable accumulated expertise in work force, starting from farmers, ending with fashion makers.

THE OBJECTIVES OF THE STUDY

The main objective of this paper is to propose the optimum mix of some factors that affect Egyptian exports of raw cotton and textiles to leverage those exports, and increase it up to the maximum capacity, also, to increase Egyptian textiles exports, finished and semi-finished, over the Egyptian raw cotton export to get maximum returns of the Egyptian textile industry. Using System Dynamics tools would help to explore the dynamics of the industry and suggest effective policies.

CONCEPTUAL MODEL

As shown in figure 1.1, the marketing variables mix to be controlled is: the distribution, the promotion, and product (through quality, and research and development). Changing the competition power, and competition distribution will represent the coming environmental changes that may affect the industry while the targeted values of marketing mix variables.
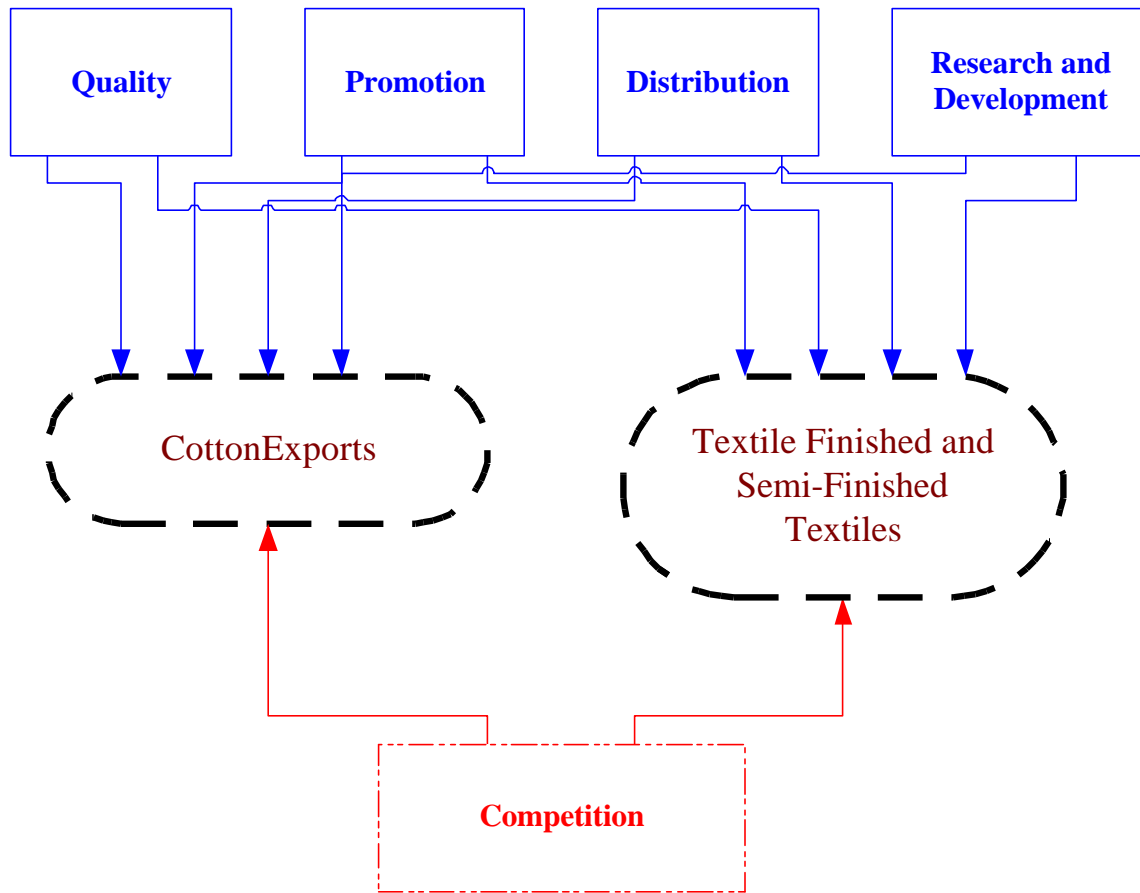
Figure 1.1 Network Variables
Source: Author

RESEARCH METHODOLOGY

The methodology adopted in this study is based on building a system dynamics model for Egyptian textile industry. Firstly, each step in this model has been analyzed based on data collected for every step and interviews with sample of experienced professionals that work in the field of this step, and steps that follow or precede this step. Secondly, System dynamics techniques have been used to build each step in the model as sub-models then connecting those sub-models to construct the total model for the whole industry. The total model and some sub models have been tested as per data availability. The research uses information and data gathered from textbooks, official and non-official publications, Internet sites, working papers by professional entities. On the other hand primary sources of information have been investigated through conducting interviews. The target people were governmental officials, businessmen, university professors, and industry professionals in public and private sectors. Figure 1.2 depicts data collection process.

Internet search, Interviews

CAPMAS, Menistries, Interviews

World Textile Industry
- Overview
- Directions

Egyptian Textile Industry
- Modern history
- SWOT

Causal loop Model
- Importance
- Variables and direct relations

Stock and flow Model
- What is stock, and what is flow?
- Stocks in the model
- Flows in the model
- Mathematical relations and assumptions.
- How it works

Interviews

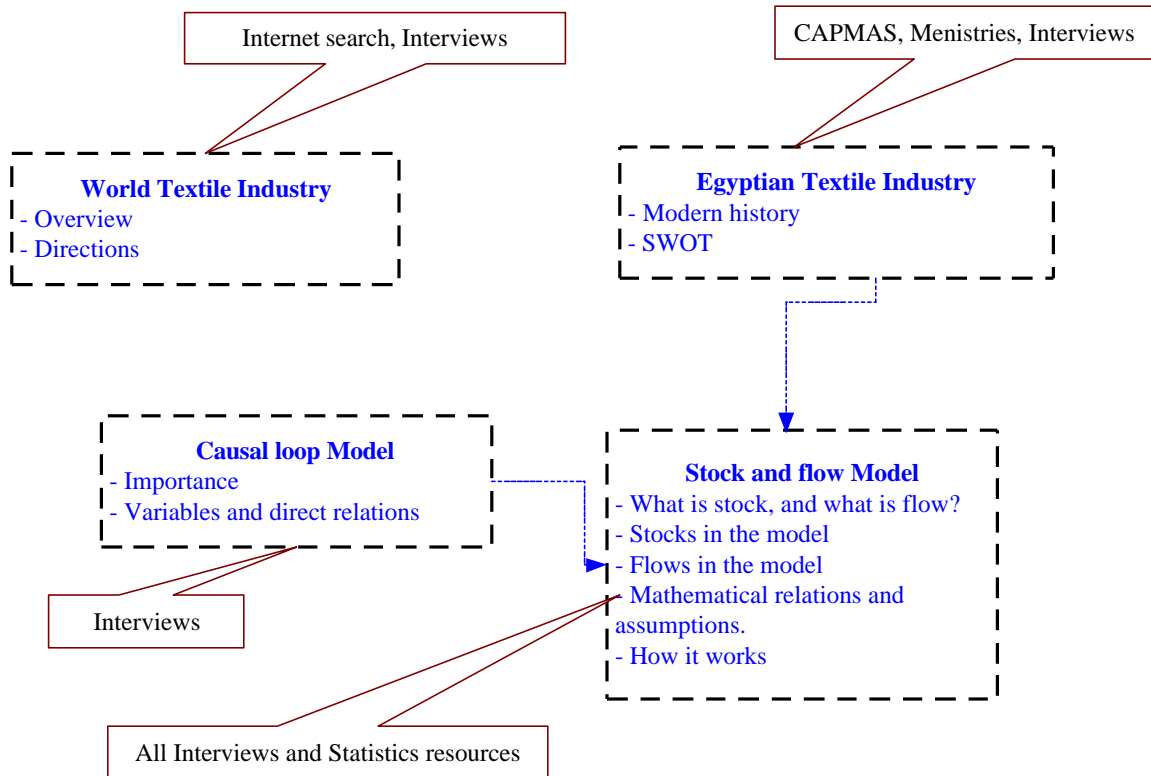All Interviews and Statistics resources

Figure 1.2 Data Collection in the Research
Source: Author

RESEARCH ASSUMPTION AND LIMITATIONS

Research is done under the following assumptions and limitations,

- Cotton is the major textile natural raw material that can be developed in Egypt for both direct exports or textiles manufacturing, Flax exports is 2.9 % of cotton exports for year 1998 and 2.2% of cotton exports for year 1999. Also, other natural textile raw materials productions, silk, Jute and wool, are so negligible to cotton production in Egypt.[1]
- Egypt imports most of its needs of man-made raw textile materials due to its relatively weak petrochemical industry.
- Raw cotton export price is constant and cannot be controlled by Egypt due to its limited capacity of cotton production, even under full efficient capacity production.

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[1] CAPMAS, 1999: p. 61

- Agriculture land rent rate is not dependent on profits that is generated from cotton only but also on other crops yields. So, it will be considered as constant as it shows stability over last ten years.
- Fear of information disclosure by both officials and non-officials.
- Most of Data for years 2000, and 2001 are not disclosed yet.
- Time and money constraints.

AN OVERVIEW AND BACKROUND

The Textile Industry

Textile production can be separated to four aggregate stages as shown in figure 2.2. Textile can be cloth, garments, or clothing.
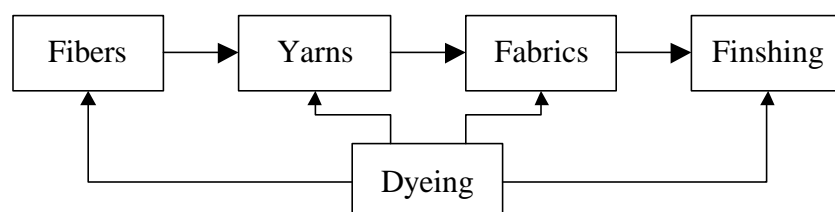

Figure 2.2 Textile Sequence of Production
Source: Miller, 1979

World Textile Industry Highlight

Final textile product properties depend on the fibers properties that are made off. Natural fibers have always of higher values than man-made ones. Textile industry depended on natural fibers until man-made fibers were developed from attempts to make artificial silk. The beauty, scarcity and costliness of silk made the possibility of man-made substitute attractive and potentially rewarding. The first filaments[2] of artificial silk were produced in the late 1880s, when knowledge of textile chemistry was rapidly advancing in European countries.[3] Despite the advantages of depending on industrial resources, Quality and quantity control, features, less space, less price fluctuation, and low price, the natural fibers give the final textile better features and higher added values. Agriculture lands are considered as limited resource to provide to natural fibers (Cotton, Flax, and Jute) to Textile industry, specially this conflict with food production. World textile industry passed through many milestones at the 20th century. Many global agreements governed the global market; the Short-Term Regarding International Trade, 1961 (STA,), Multi-Fiber Agreement, 1973, 1995 (MFA), the General Agreement on Tariffs and Trade (GATT).[4], Agreement on Textile and Clothing, 1995 (ATC).[5],

Cotton production is widely spread between 40 degrees north and 40 degrees south of the equator. [6] However, as shown in Table 1, the fourteen largest cotton-producing countries accounted for over 81.36% of world output in the 1998/99-crop year. Cotton is harvested from the plant in the form of

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[2] Filament is long fiber. Its' length is measured in multiple of hundreds of meters.

[3] Miller, 1797: p 39

[4] Goto, 1989: p 23

[5] Kheir-El-Din, 1998: p 3

[6] Coleman, 1991: p 6

Seed cotton and requires processing (ginning) to separate the seeds from the fiber (lint). In many African and Asian countries the gins are owned and operated by governments and farmers typically sell their Seed cotton to government or private agents before ginning. In other cases, for example in North America, the cotton gins are owned privately or by cooperatives and farmers maintain ownership of their cotton while paying a fee for ginning services. In this case, farmers are responsible for merchandising their Lint cotton, through cotton merchants or cooperatives, or directly to textile mills.[7]

Table 1 - Global Production of Cotton, 1999
(Values in 1000 Tons)

China	3670	Turkey	838	Greece	382	Total Large Producers
USA	3030	Australia	697	Syria	335	16228
India	2787	Brazil	435	Sudan	250	
Pakistan	1372	Tazikstan	500	Egypt	229	World
Uzbekistan	1002	Spain	483	Mexico	218	19945

Source: Swamy, 2001

There are a number of features of cotton demand that make the estimation task different from modeling the demand for many other agricultural products. There is no theoretical rationale for directly estimating consumer demand for raw cotton. The processors in response demand raw cotton to final consumer demand for apparel items and other manufactured textile products. This feature of cotton demand is complicated by the fact that manufactured textile and apparel items are often mixtures of fibers (e.g., blends of cotton and polyester), and individuals tend to be relatively insensitive to the fiber composition. Further, it appears that consumers are insensitive to the prices of individual fibers (e.g., cotton prices relative to polyester prices) because, in general, the fiber component represents only a small proportion of the final purchase price and, within a fairly wide range of blends, consumers are relatively insensitive to different textile mixtures. Therefore, consumer demand can be expected to be highly inelastic.

Textile and apparel manufacturers who purchase raw cotton tends to be much more sensitive than consumers to the relative prices of individual fiber types. Most processing plant technology enables manufactures to substitute fibers quickly but at some cost. Thus, demand by manufacturers tends to be much more pricing elastic than at the consumer level.[8] As shown in figure 2.3, the world exports of cotton is almost constant over the last ten years while production change in a cyclic way every four years and consumption is fairly stable. So, increasing shares of exports for any country is really tough under heavy competition. Differences between production and consumption lead to fluctuations of stocks of cotton for producing countries, specially developing exporting countries. The increase of world cotton stocks, as shown in figure 2.4, puts those countries under pressure to decrease price, especially under the need of hard currency income of cotton exports.

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[7] Coleman, 1991: p 9,   Nishimizu, 1999: p. 25
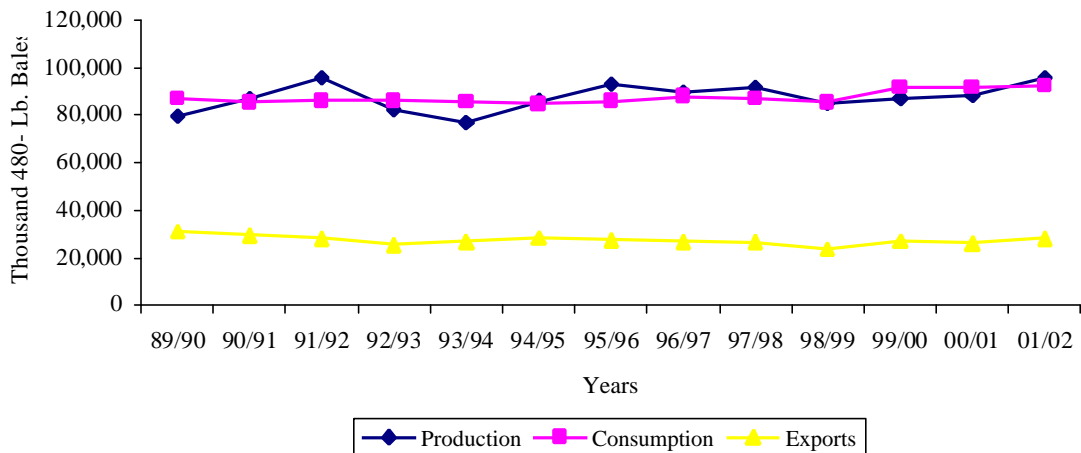
[8] Coleman, 1991: p 11

Figure 2.3 World Cotton Production, Consumption, and Exports

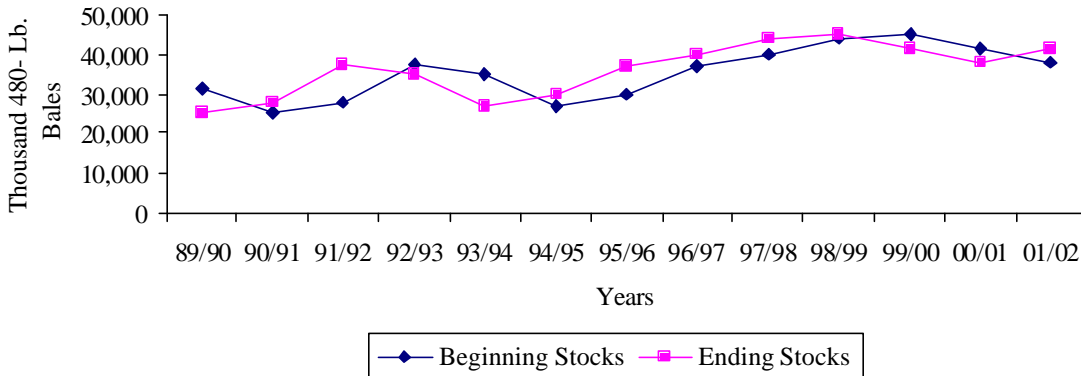*Source: USA Department of Agriculture, July 2001, year 2002 is forecasted*

Figure 2.4 World Cotton Beginning Stocks and Ending Stocks

Source: USA Department of Agriculture, July 2001, year 2002 is forecasted

Modern History of the Egyptian Textile Industry

Modern Egyptian Textile Industry started at the middle of 19th century. By this time, Egypt was known as large exporter of lint cotton and hand-made woven textile. Under ruling of Mohamed Ali, and his successors, Textile industry depended on the agriculture of fine cotton then spinning it. At 1927, the industry bases turned to be scientific and the industry was extended to manufacturing of final products of textiles. Egypt started to be an exporter country in textile products beside cotton exporter at 1949.[9]

The ownership of the industry passed through many phases during the 20th century. The industry grew up rapidly under private ownership from 1920s to 1950s. At the beginnings of 1960, most Private sector companies were nationalized. Egyptian textile exports were rapidly increasing to former Soviet Union and Eastern block countries, as per strong political relationships and bilateral trade agreements. The introduction of open door policy at 1973 was accompanied by slower growth in the public sector

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[9] ETIC, 1999: p 30

and emergence of small private sector ready-made garment manufacturing companies. Government centralized the management of the public textile industry by transforming control to the newly formed holding companies, the textile Industries Corporation (TIC), at 1985. Private sector put significant investment and expanded in spinning capacity, dyeing, and non-cotton cloth.

Egyptian Textile industry structure
The industry is largely dominated by 31 public sector textile manufacturing companies of which 25 processes cotton. These companies are mainly composed of large vertically integrated mills engaged in spinning, weaving, dyeing, finishing, garment making and even retailing. They operate under Law 203 of 1991 and are distributed among three public holding companies (HCs), which have exclusive or majority ownership of the share capital of these affiliated companies (ACs). This Law provides HCs and ACs operate as other private sector companies incorporated under Law 159 of 1981. In addition, mixed companies, including El-Ameriya (owned by Misr bank) and Miratex (owned by several public sector companies and Iranian government), operate under Investment Law 230 of 1989. These public and mixed enterprises dominate the textile industry, accounting for all cotton spinning and about 60% of waving. They are also involved in spinning and weaving wool, jute and other fibers. Cotton is a predominant component of Egyptian textile industry.

Private sector participation in weaving and ready-made garment production has grown significantly, to reach 55% of fabric production and, to exceed 85% of total production of garments during the 90s. The private sector is composed of many traditional small workshops and a smaller number of medium firms to large firms, many of which are joint ventures under Law 230 of 1989.[10]

Egyptian Textile Exports Structure
European Union (EU) as the Egypt's largest trading partner, accounting for 40% of Egypt's foreign trade. EU imported 51% of Egyptian raw cotton exports at year 1999[11], and on average 60% of Egyptian textiles exports. For the same year, the United States imported 16% of Egyptian textiles exports and 7% of Egyptian raw cotton exports.[12]

Part of the government of Egypt 's program for expanding exports is to try to realize the trade (and investment) creation effects of regional economic and trade integration through free trade agreements or customs unions to take advantage of Egypt's geographically central location in the world to establish it as both a production and a regional marketing center.

EGYPTIAN TEXTILE INDUSTRY SYSTEM DYNAMICS MODEL
This section discusses the factors that affect Egyptian textile industry and cotton exports. Causal loop diagram has been developed for of Egyptian textile industry. Then stock and flow representation for the same model declared deeply to explain the final flight simulator for the same model.

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[10] Kheir-El-Din, 1997: p 2

[11] CAPMAS, 1999:p 33

[12] Abd-Alhamid, 2001: p 12

Causal Loop Diagram

Figure 3.1 shows the causal loop diagram for the network of variables that affect Egyptian cotton and Egyptian textile industry that is based on cotton as the main raw material. Each link in the figure denotes the relation between the two variables. But this does not mean that the dependent variable remains dependent for all its relations with other variables. The variable may be considered as independent in the relations that it seems as a cause of change, and in the same time it may be considered as dependent in other relations that it seems as an effect of change. Causal loop diagram shown at figure 3.1 should be read from the right down corner and move in clockwise direction. At the right corner, the costs of cotton agriculture and revenue per fedan (acre) are mapped. Then moving to the left down corner where the local cotton production and cotton imports are represented. The upper left corner maps the textile-manufacturing sector including all its costs and profits. Finally, the upper right corner represents the exports and the input variables of the model.

Appendix A shows seven input variables, that will be used as controls to reach the policies.

Description of the Causal loop diagram and Feedback Loops

There are many reinforcing and balancing loops in causal loop diagram illustrated at figure 3.1. For example, B1 is balancing loop that starts at "Agriculture R and D", then "Agriculture Labor Wages", passing by "Seed Cotton Cost Per Fedan (acer)", and negatively passing by "Seed Cotton Net Profit Per Fedan", and finally back to "Agriculture R and D". So "Agriculture R and D" will have opposite effect on itself through this loop, so it is named as balancing loop. On the other hand, R1 is reinforcing loop because "Agriculture R and D" will have stronger effect in the same direction of change through this loop. There are other balancing loops, B2 - B4, in the causal loop diagram, and reinforcing loops also, R2 – R6. All these loops are clearly declared in figure 3.1.
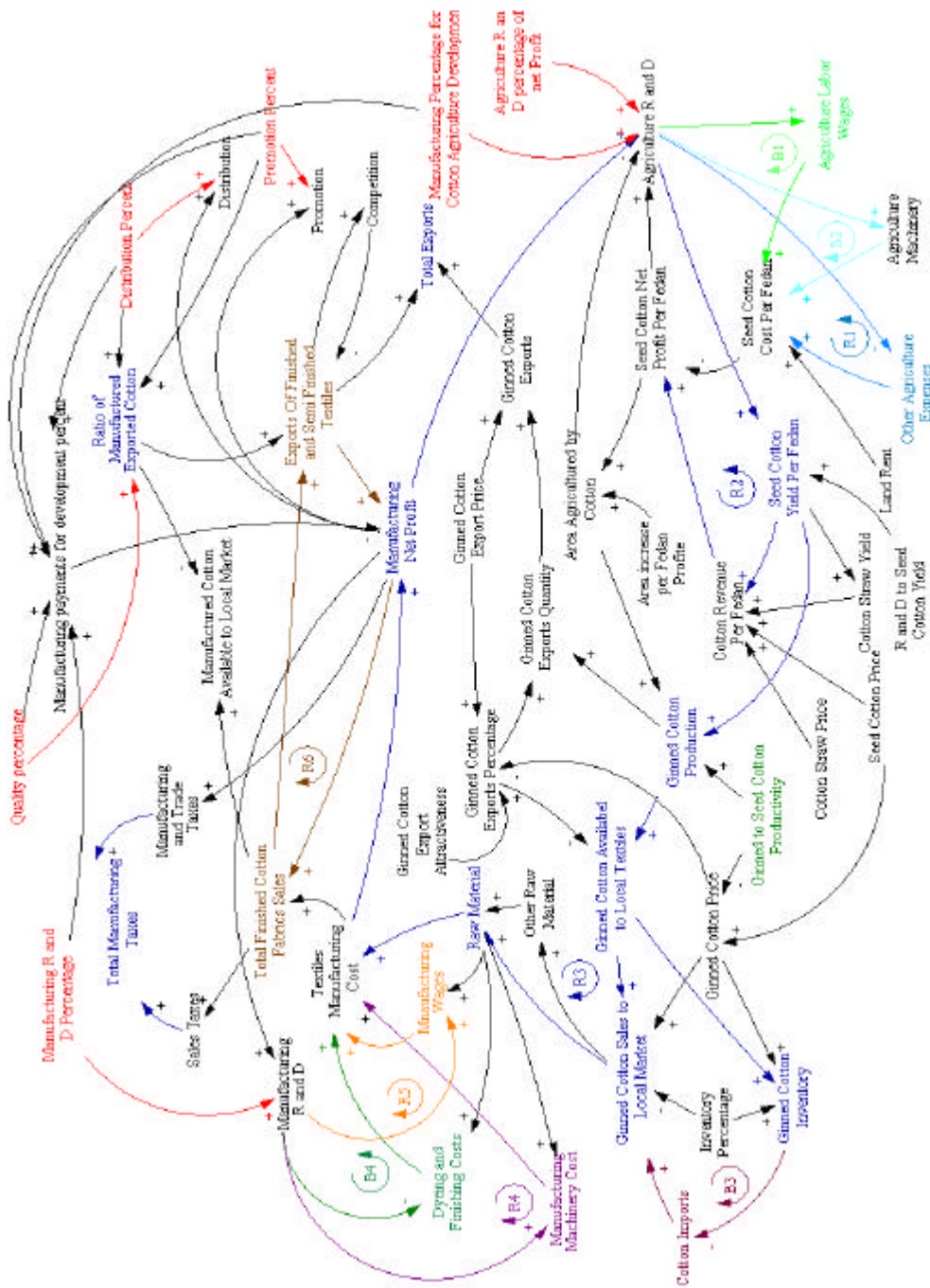
Figure 3.1 Causal loop Model

Source: Author

Stocks and Flows Diagram

Stocks and flows diagram is separated to four interrelated sectors as shown in figure 3.3. Each of the four sectors has stocks and flows that represent the variables related to mainly to that sector but may affect, and affected by, other variables in other sectors. The sectors are used to present better understanding to the network of variables and their relations. Variables' units were included in table 3.1, because the variables are the same in the two diagrams. Stock name starts with capital letter and all the word in the name. Flow and converter names words are in small letter case, except for R and D

letters, which represent research and development respectively. Inflow and outflow names are expressive, but some of it are the first letters, in a small case, of its' stocks.
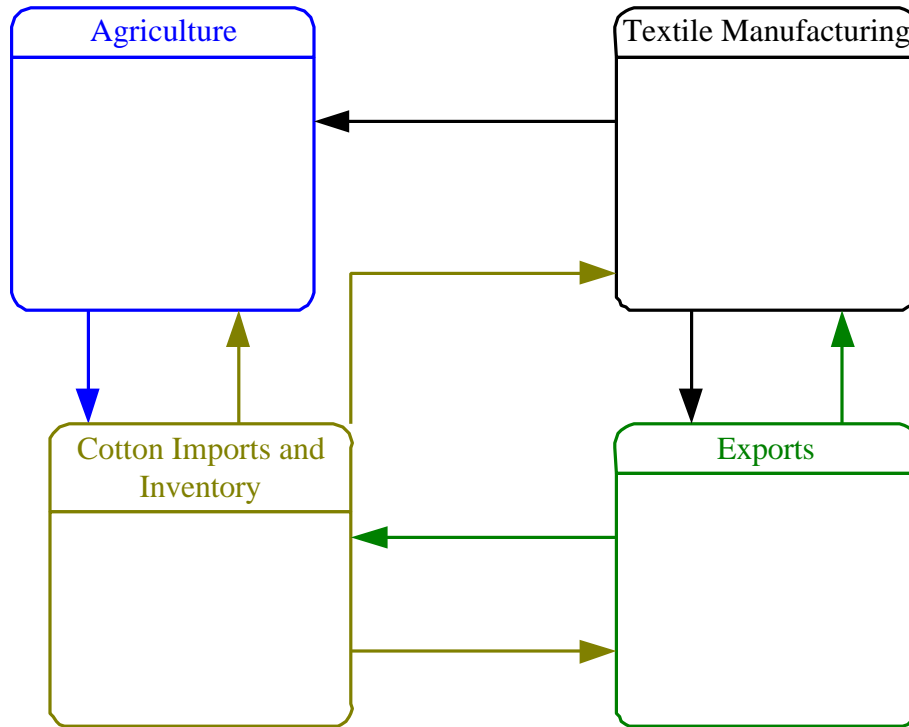

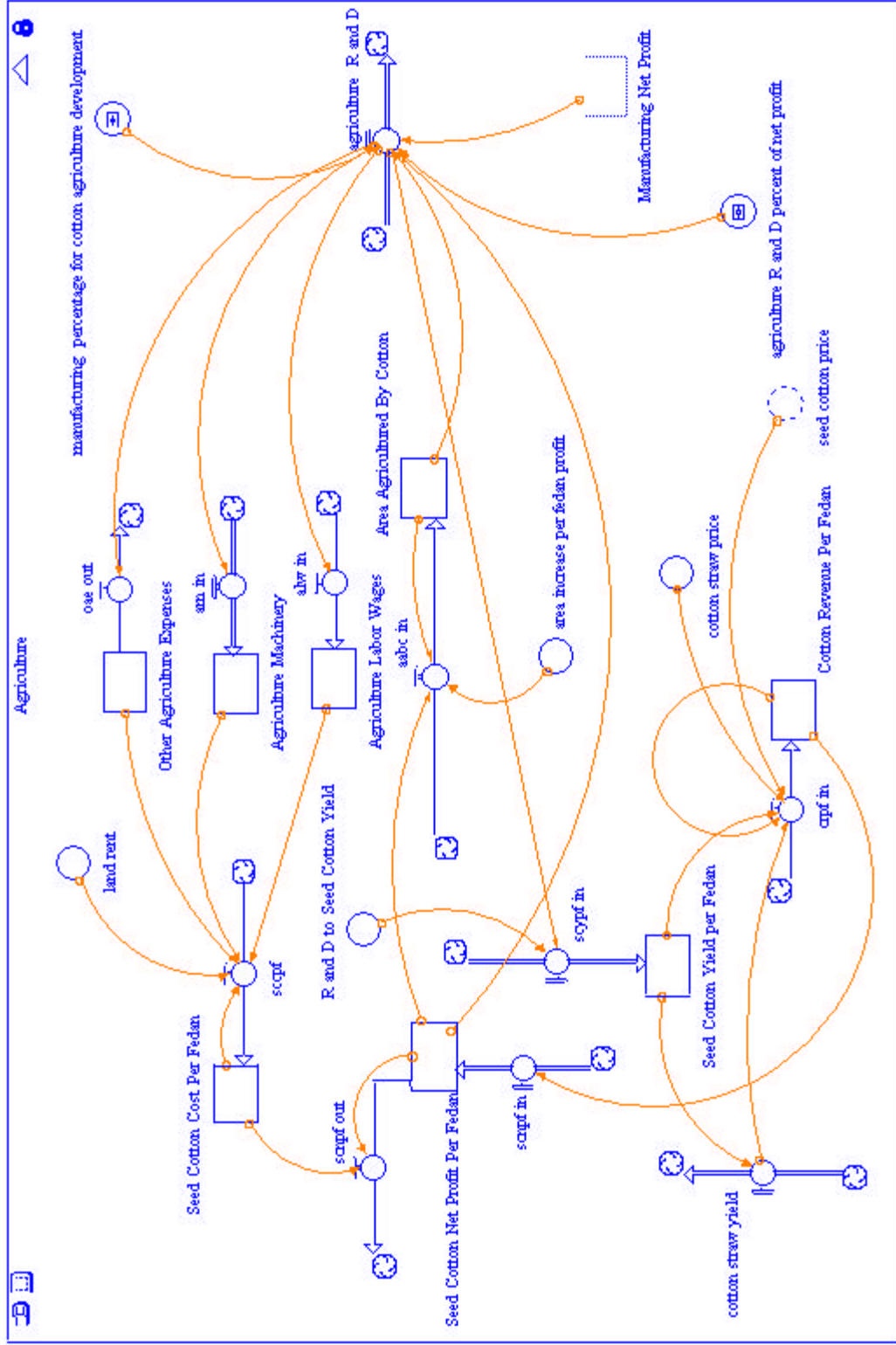Figure 3.3 Stocks and Flows Diagram Sectors
Source: Author

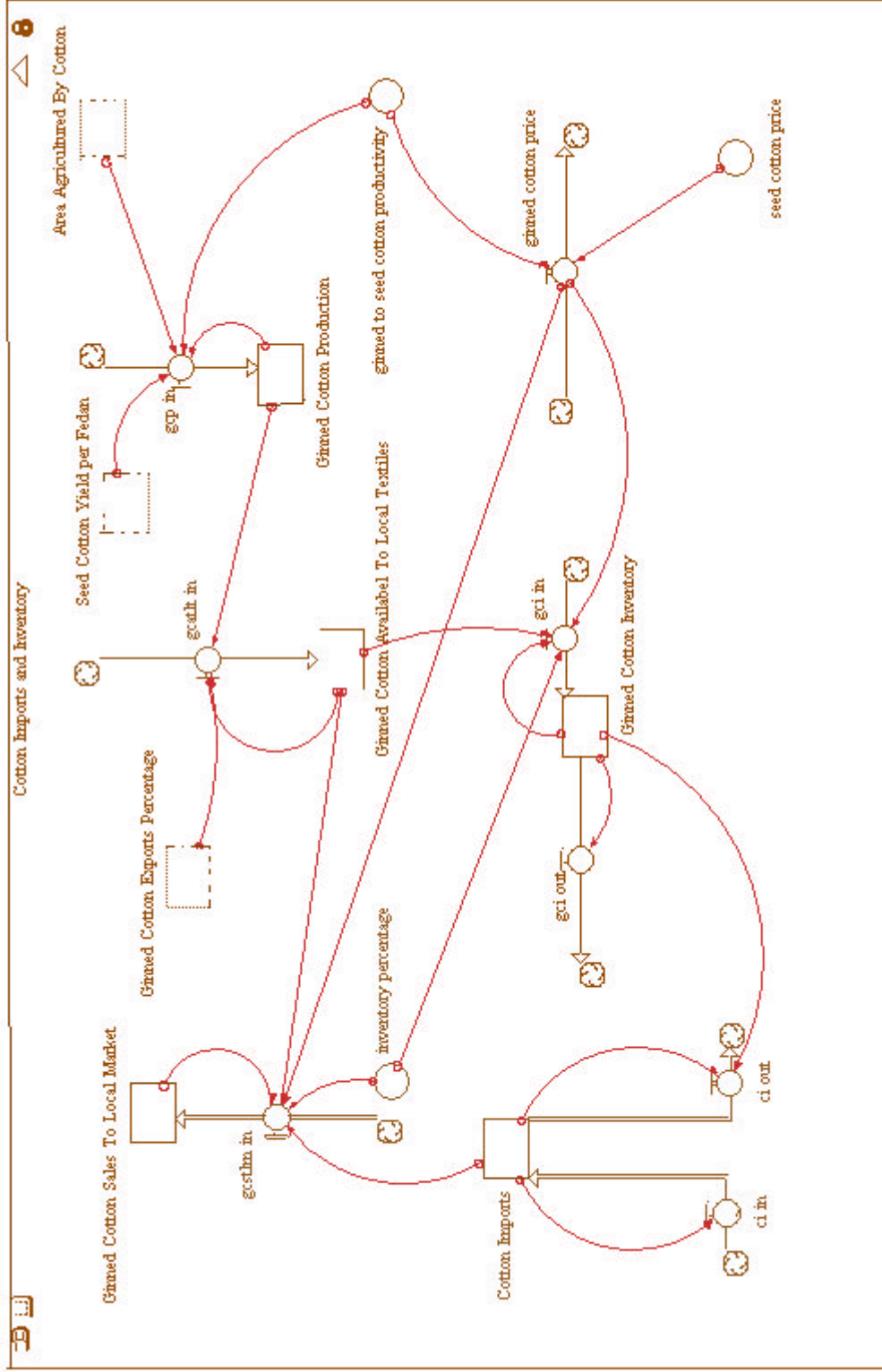Figure 3.4 Agriculture Sector Stocks and Flows

Source: Author

Figure 3.5 Cotton Imports and Inventory Sector Stocks and Flows
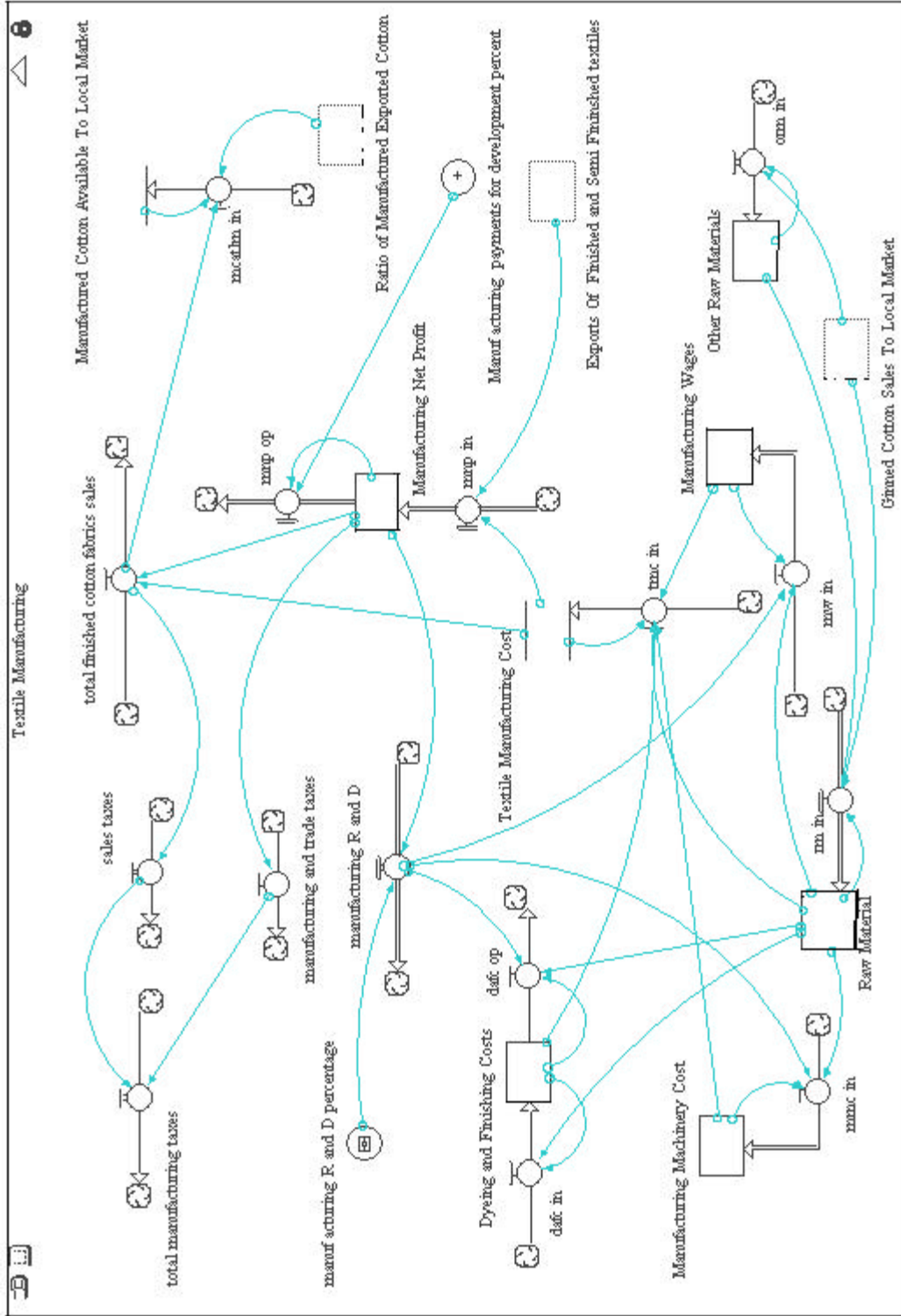
Source : Author

Figure 3.6 Textile Manufacturing Sector Stocks and flows
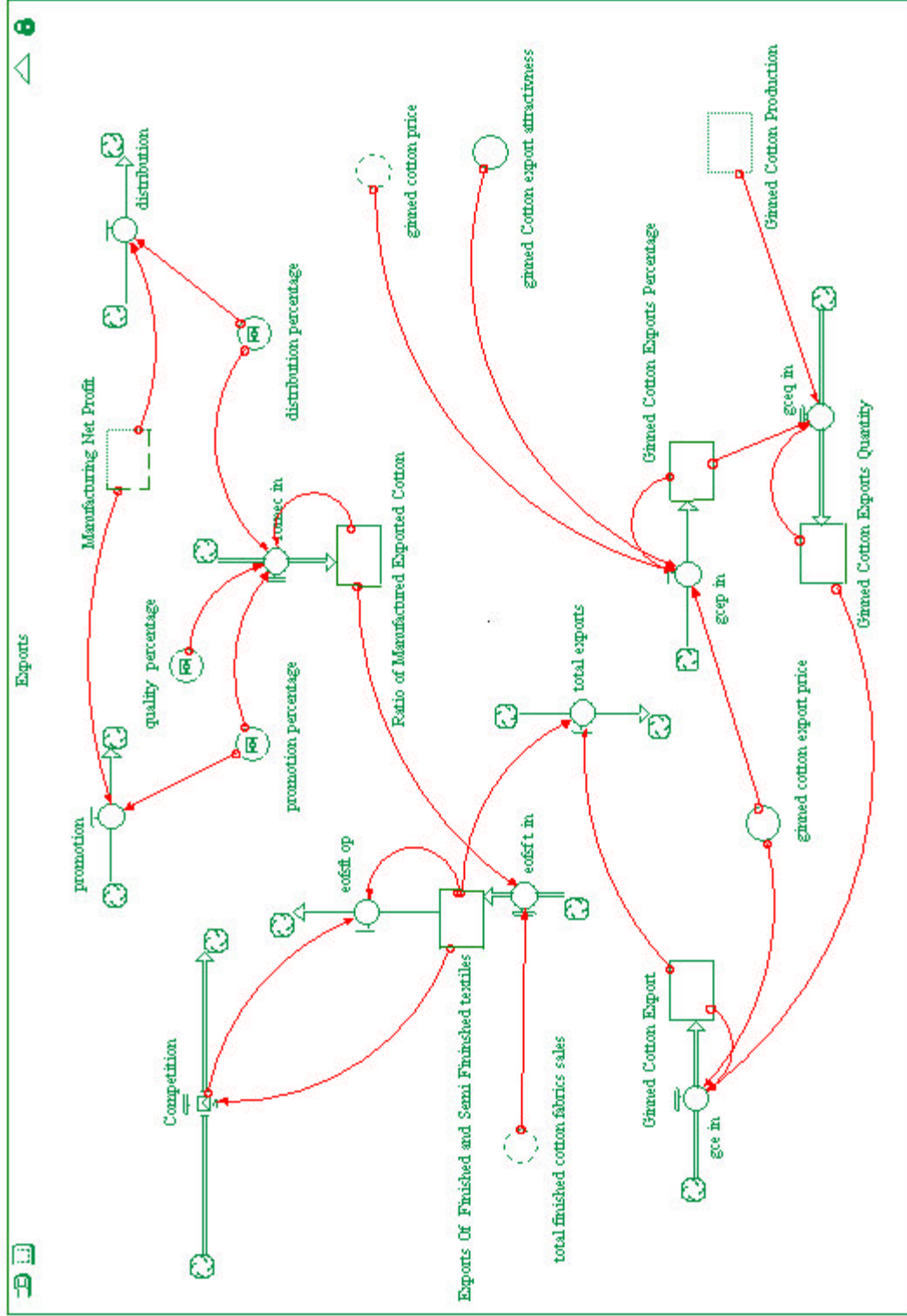
Source: Author

Figure 3.7 Exports Sector Stocks and Flows

Source : Author

Relationships between Sectors
Sectors are not isolated from each other's. They are interrelated. After connecting the whole and complete model, it has been validated, tested and the sensitivity analysis haven performed.

EGYPTIAN TEXTILE INDUSTRY FUTURE STRATEGIES
In this section the interface of the built model will be presented, then usage of this interface to change the input variables and monitor the changes in output. After building knowledge of model interface, it will be used for hunting the best sires of values for the input controls to achieve the future targets of Egyptian textile industry.

Input Variables Analysis
Input variables batches presented to the developed model are designed to cover all changes that the user may think about. So all the probabilities of different mixes of input variables are covered. This enables the user to be exposed to all trends in outputs as per changes in inputs. Any input has one value per run, except competition.

The model exposed to 66 runs, with different input values for each. Those runs can be categorized into two types of runs. The first category does not include any competition input, this category includes runs from 1 to 33. Figure 3.4 shows this category. The second one includes a competition effect, it includes the other 33 runs from 34 to 66. Figure 4.4 shows this category. The competition input is a graphical input. The chosen graphical input expresses the expected competition trend for the next ten years, it reflects all the expected environmental changes covered in chapter two. Figure 4.3 shows the designed competition input. It ramps up gradually until GATT application, then it goes constant for two years, and finally decrease to a constant level for the rest of the period.

Input	Output
0.000	0.100
0.500	0.300
1.000	0.500
1.500	0.700
2.000	0.900
2.500	0.900
3.000	0.900
3.500	0.800
4.000	0.800
4.500	0.800
5.000	0.800

Data Points: 11

(Exports_Of_Finished_and_Semi_Fininshed_T...
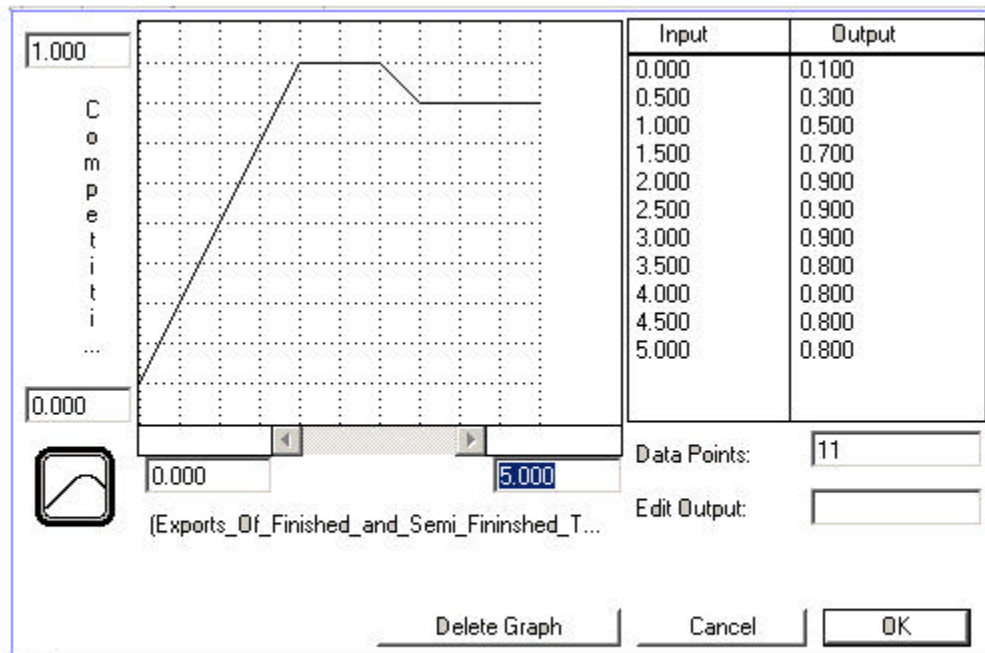
Figure 4.3 Competition Effect

Source: Author

Figure 4.4 Input Variables For Runs From 1 to 33

Source: Author

Input Variables, Runs (34 - 66)

Inputs , Ratios

Legend:
- Agriculture R and D percentage of net Profit
- Distribution Percent
- Promotion Percent
- Competition
- Manufacturing Percentage for Cotton Agriculture Development
- Manufacturing R and D Percentage
- Quality Percentage

Figure 4.5 Input Variables For Runs From 34 to 66

Source: Author

As illustrated in figure 4.4, the changes in input from run to another one started by changing inputs for agriculture sector, then manufacturing sector, and finally both. Figure 4.5 have the same input changes but with one single difference which is the application of competition, which is the same for all last 33 runs. The inputs design considers changes in inputs individually and as groups.

Output Variables Analysis
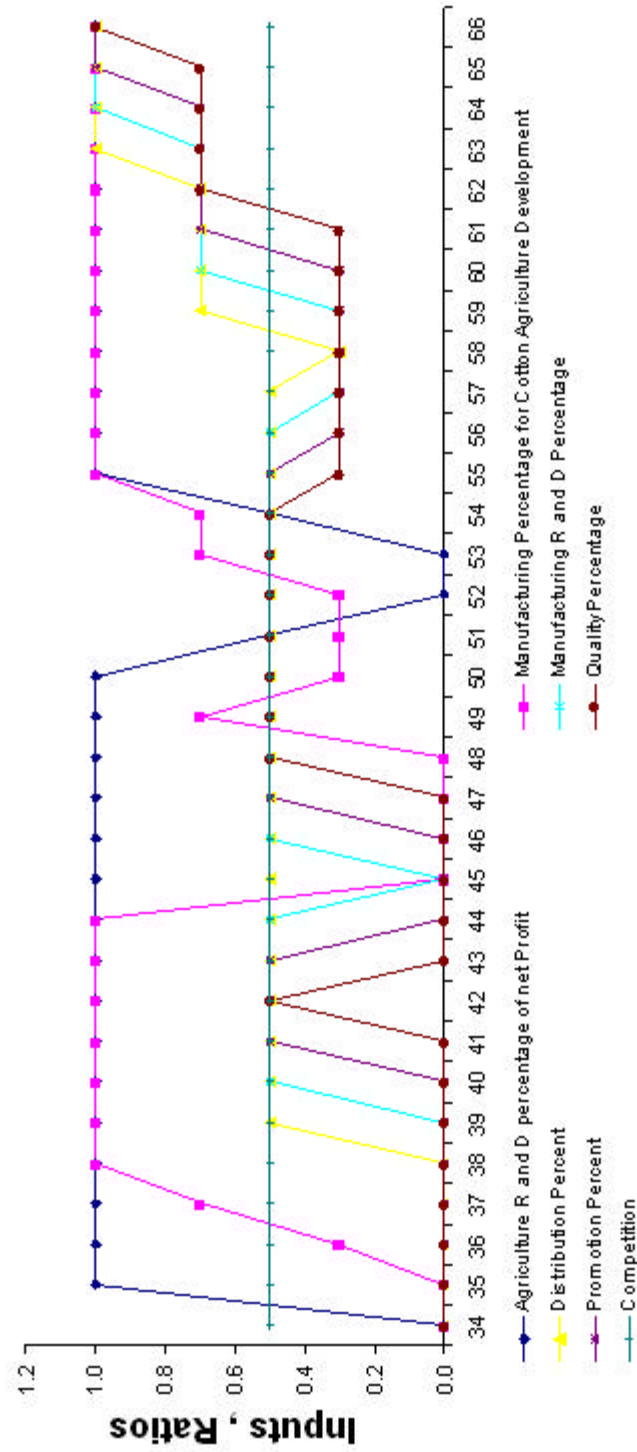
Output variables are ginned cotton exports (raw cotton exports), exports of finished and semi-finished textiles, and total exports of both. Figure 4.6 and figure 4.7 show those three variables as per inputs changes. Connecting figure 4.6 with figure 4.4, and figure 4.7 with 4.5, we can get the effect of input changes to output changes and come up with suitable inputs combinations to achieve the study goals. Also, comparing figure 4.6 with figure 4.7 help for assessing competition risks. After applying the comparison between several runs, some relations were captured as follows:

- ❑ Raw cotton exports goes up and down very similarly with manufacturing percentage of cotton agriculture development. So, agriculture research and development should depend on manufacturing investment than agriculture investment to increase raw cotton exports. The agriculture share in agriculture research and development is not effective enough to get the cotton high productivity and attractiveness for cotton agriculture, while textile manufacturing share in cotton agriculture research and development. The reason behind that is the low profits generated by cotton agriculture that weaken the ability of agriculture sector to present considerable investment for development. The fact that profits generated by manufacturing is much higher than profits generated by agriculture gives manufacturing sector the ability to invest part of this profits

- ❑ Raw Cotton exports will have the higher values than finished and semi-finished textiles except under continuous high investments in all input variables, including the manufacturing participation in financing cotton agriculture research and development, at the same time.
- ❑ Investment in cotton agriculture is more rewarding for profit than manufacturing for the next ten years.
- ❑ Investment in quality and manufacturing research and development is more effective to increase finished and semi-finished textiles exports than investment in promotion and distribution.
- ❑ Investment in quality is rewarding if it continues at high levels for long time. Accumulation of quality investment is important to ramp up the manufactured textiles.
- ❑ Increase in distribution and promotion helps against competition with result higher than research and development, and quality.

Exports, Runs (1-33)
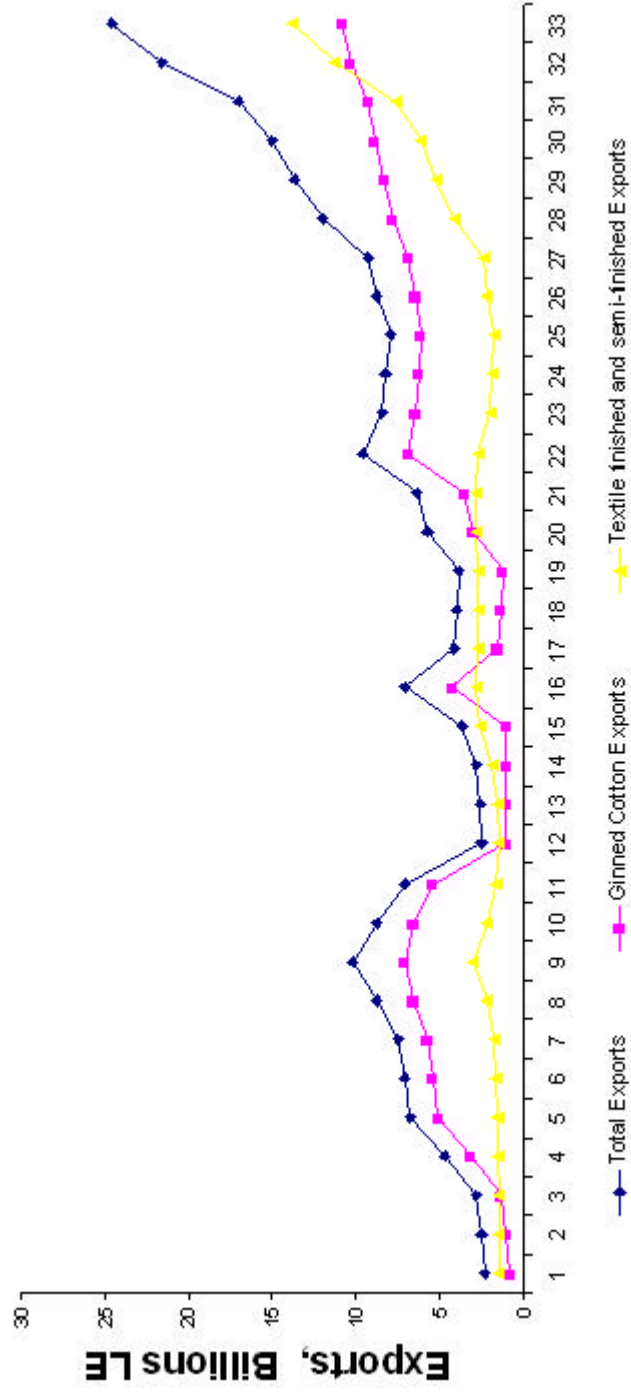
Figure 4.6 Output Variables For Runs From 1 To 33

Source: Author

Legend:
- Total Exports
- Ginned Cotton Exports
- Textile finished and semi-finished Exports

Y-axis: Exports, Billions LE (0, 5, 10, 15, 20, 25, 30)

X-axis: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33
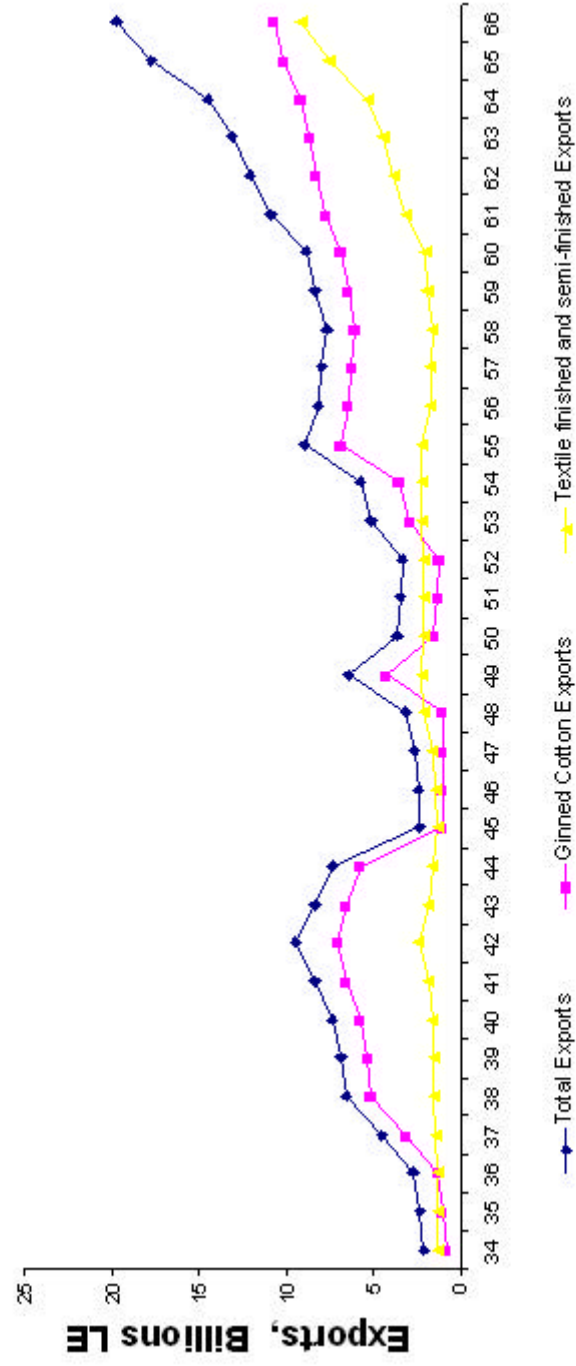
Exports, Runs (34-66)

Figure 4.7 Output Variables For Runs From 34 To 66

Source: Author

RECOMMENDATIONS AND POLICIES

The exports of raw cotton and manufactured cotton were measured against inputs change of the model to measure the effects of those changes on it. The results of those runs lead to some recommendations to agriculture sector, manufacturing sector, and government to develop its exports. Also, strategies for both sectors are derived from binding results of model runs and facts of environment surrounding the Egyptian textile industry, stated in the study.

Recommendations to Agriculture Sector

The profitability of cotton agriculture is low, which leads to the small area agricultured by cotton, so the profitability of cotton should increase by lowering the costs of cotton agriculture. Massive research and development is needed to increase productivity of land agricultured by cotton to increase the yield of Fedan (acre) to the double. This will increase the profitability of cotton agriculture. Increasing the profitability of cotton agriculture will lead to increase the attractiveness to cotton agriculture and increase in area agricultured by fine Egyptian cotton. Attention should be paid to keep Egyptian cotton global reputation as the finest cotton, because this reputation is the reason for international absorption of Egyptian long staple cotton, even with maximum yield capacity. Egyptian cotton logo should be promoted for to distinguish products made 100% out of it, this will increase exports of both raw cotton and finished textiles made of it. Finest long staple cotton should be agricultured rather than short staple cotton to increase raw cotton exports due fact that, the quality of Egyptian cotton defeated any competition and there is no expected competition for Egyptian long staple cotton.

Investments from textile manufacturing sector should be directed to research and development of cotton agriculture before GATT full application to increase cotton production so that decrease their raw material high costs. The fact that manufacturing return of investment is much higher than agriculture return on investment enables industry to present portion of its profits to agriculture for inducing lower costs of raw material. This needs creation of sustainable strong link between textiles manufacturer and cotton farmers that helps both parties to increase their profits by sharing fairly those profits.

Recommendations to Manufacturing Sector

Manufacturing sector has to develop its facilities of production to have more control over cost. So it should direct a big part of its profit to research and development to lower raw material cost. Also research and development is intensively needed to modernize the factories. Both market penetration and products development are needed to increase exports of finished and semi-finished textiles, by using Egyptian cotton with sustainable investment in quality. Investments should be directed to quality development to face wild competition. Investment in quality will not be profitable on the short run but it helps a lot against coming competition as barrier for change, especially that niche market was, and will be, the target segment. Promotion of Egyptian cottoned textiles should be continuous to keep current niche markets to extend the uniqueness of Egyptian cotton to finished and semi-finished Egyptian textiles. Exports distribution channels should be established immediately with long run agreements to build strong barriers against expected competition on the long run. Also, decreasing the length of distribution channels guarantees better profits and better access to the target niche market. The Egyptian textile manufacturers that depend on presenting low quality textile made of short staple cotton, man-made fibers, or mix of it will face killing problems after GATT applications because of large stock of cotton in Asia that will make the raw material more cheaper but will make the finished and semi-finished textiles much cheaper, even after transportation costs. So dependence on Egyptian competitive advantage, long stable cotton, and changing target segment to niche market would be the

solution. To adapt this solution, Investment should be directed intensively to quality, and manufacturing research and development, and continuously with lower volume to distribution and promotion.

Recommendations to Government
For long years government controlled both cotton agriculture and cottoned textiles manufacturing. So there was no problem in controlling the value chain of Egyptian cottoned textiles except for exporting finished cottoned textiles. Now, the privatization of public sector textiles sector has been started , and it is believed the governmental control on cotton agriculture will be lost in the short-run, So the government should organize a fair alley between cotton farmers and textile manufacturers. Otherwise both of them will ask for getting higher portion of profit, farmers by exporting raw cotton and manufacturer by using cheap raw materials directing the production to the local market, and this will lead loosing profits for both because this will decrease the chances of investments to increase cotton yield, and decrease barriers of global competition. The proposed alley should be under free market conditions. Also it should be rapidly developed before GATT application and textile industry privatization.

Agriculture research center should be more available and have the suitable financial resources. Government should help exporter to build up strong distribution channels under free trade agreements already signed, especially for European Union, and Arab world.

CONCLUSION
As a conclusion, the Egyptian textile industry aims at developing a local strong textile industry that would be competitive on an international scale. In doing so, Egypt will be highly anchoring on both, its finest cotton production and huge textile manufacturing facilities, that must be developed rapidly and strongly to achieve the required high objectives under tough environmental changes and critical time limitations. There should be strong collaboration between cotton farmers and textile manufacturers to increase profits generated from both steps in textile value chain and protect the Egyptian textile industry from sudden undesirable collapse under coming expected global agreements conditions. Egyptian textile manufacturers should base their products development on the competitive advantage of Egypt of finest cotton production to increase value added to final product and establish barriers for competition. They should adopt strategy to enhance their products quality, to establish short distribution channels with importers that have direct access to niche market segment. Furthermore, branding textiles of Egyptian cotton origin would boost raw cotton exports firstly, then finished textiles. Fast bulk investments should be pumped to cotton agriculture to increase the production of raw cotton without decreasing quality. Also, sustainable research and development are badly needed for manufacturing facilities.

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APPENDIX A

CLD- Variables Relations

Variable	Unit	Variables Directly Affect this Variable
Agriculture Labor Wages	LE (Egyptian Pound)/ Fedan (Acre)	Agriculture R and D (+)
Agriculture Machinery	LE / Fedan	Agriculture R and D (+)
Agriculture R and D	LE / Fedan	Seed Cotton Net Profit Per Fedan (+), Manufacturing Net Profit (+), Area Agricultured by Cotton (-)
Agriculture R and D percentage of net Profit	Percentage	Input
Area Agricultured by Cotton	Fedan	Seed Cotton Net Profit Per Fedan (+)
Area increase per Fedan Profit	Fedan*Fedan /LE	Constant
Competition	Percentage	Input
Cotton Imports	LE	Ginned Cotton Inventory (-)
Cotton Revenue Per Fedan	LE / Fedan	Seed Cotton Price(+), Seed Cotton Yield Per Fedan(+)
Cotton Straw Price	LE / MQS[13]	Constant
Cotton Straw Yield	MQS / Fedan	Seed Cotton Yield Per Fedan(+)
Distribution	LE	Manufacturing Net Profit(+)
Distribution Percent	Percentage	Input
Dyeing and Finishing Costs	LE	Raw Material (+), Manufacturing R and D (-)
Exports Of Finished and Semi Finished Textiles	LE	Ratio of Manufactured Exported Cotton (+), Total Finished Cotton Fabrics Sales (+), Competition (-)

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[13] MQS= Metric Qentar of seed cotton= 157.5 K. Gram

Ginned Cotton Available to Local Textiles	MQG[14]	Ginned Cotton Production (+), Ginned Cotton Exports Percentage (-)
Ginned Cotton Export Attractiveness	Ratio	Export ginned Cotton Price (+), Local Cotton Price (-)
Ginned Cotton Export Price	LE / MQG	Constant (Assumption)
Ginned Cotton Exports	LE	Ginned Cotton Exports Quantity (+)
Ginned Cotton Exports Percentage	Percentage	Ginned Cotton Price (-), Ginned Cotton Export Attractiveness (-)
Ginned Cotton Exports Quantity	MQG	Ginned Cotton Production (+), Ginned Cotton Exports Percentage (+)
Ginned Cotton Inventory	LE	Ginned Cotton Price (+), Ginned Cotton Available to Local Textiles (+)
Ginned Cotton Price	LE / MQG	Seed Cotton Price (+), Ginned to Seed Cotton Productivity (-)
Ginned Cotton Production	MQG	Area Agricultured by Cotton (+), Seed Cotton Yield Per Fedan (+)
Ginned Cotton Sales to Local Market	LE	Cotton Imports (+), Ginned Cotton Price (+), Ginned Cotton Available to Local Textiles (+), Inventory Percentage (-)
Ginned to Seed Cotton Productivity	MQG / MQS	Constant
Inventory Percentage	Percentage	Constant
Land Rent	LE / Fedan	Constant
Manufactured Cotton Available to Local Market	LE	Total Finished Cotton Fabrics Sales (+), Ratio of Manufactured Exported Cotton (-), Manufactured Cotton Available to Local Market(-)
Manufacturing and Trade Taxes	LE	Manufacturing Net Profit (+)
Manufacturing Machinery Cost	LE	Raw Material (+), Manufacturing R and D (+)
Manufacturing Net Profit	LE	Textiles Manufacturing Cost (+), Exports Of Finished and Semi Finished Textiles (+), Manufacturing payments for development percent (-)
Manufacturing payments for development percent	Percentage	Manufacturing Percentage for Cotton Agriculture Development (+), Distribution Percent (+), Manufacturing R and D Percentage (+), Quality percentage(+), Promotion Percent (+)

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[14] MQG= Metric Qentar of Ginned Cotton = 50 K. Gram

Manufacturing Percentage for Cotton Agriculture Development	Percentage	Input
Manufacturing R and D	LE	Manufacturing Net Profit (+), Manufacturing R and D Percentage (+)
Manufacturing R and D Percentage	Percentage	Input
Manufacturing Wages	LE	Raw Material (+), Manufacturing R and D (-)
Other Agriculture Expenses	LE / Fedan	Agriculture R and D (+)
Other Raw Material	LE	Ginned Cotton Sales to Local Market (+)
Promotion	LE	Manufacturing Net Profit (+), Promotion Percent(+)
Promotion Percent	Percentage	Input
Quality Percentage	Percentage	Input
R and D to Seed Cotton Yield	MQS / LE	Constant (Assumption)
Ratio of Manufactured Exported Cotton	Ratio	Distribution Percent (+), Promotion Percent(+) , Quality percentage (+), Ratio of Manufactured Exported Cotton (+)
Raw Material	LE	Ginned Cotton Sales to Local Market (+), Other Raw Material (+)
Sales Taxes	LE	Total Finished Cotton Fabrics Sales (+)
Seed Cotton Cost Per Fedan	LE / Fedan	Agriculture Labor Wages (+), Agriculture Machinery (+), Other Agriculture Expenses(+), Land Rent (+)
Seed Cotton Net Profit Per Fedan	LE / Fedan	Cotton Revenue Per Fedan (+), Seed Cotton Cost Per Fedan (-)
Seed Cotton Price	LE / MQS	Constant
Seed Cotton Yield Per Fedan	MQS / Fedan	Agriculture R and D (+), R and D to Seed Cotton Yield (+)
Textiles Manufacturing Cost	LE	Dyeing and Finishing Costs (+), Manufacturing Machinery Cost (+), Raw Material (+), Manufacturing Wages (+)
Total Exports	LE	Ginned Cotton Exports (+), Exports Of Finished and Semi Finished Textiles (+)
Total Finished Cotton Fabrics Sales	LE	Manufacturing Net Profit (+), Textiles Manufacturing Cost (+)
Total Manufacturing Taxes	LE	Manufacturing and Trade Taxes(+), Sales Taxes (+)

Source: Author
LE: Egyptian Pound (US$=4.65 LE,2002)