



# Profiting through Quality: Improving 'Right First Time'

Learning from systematic and collaborative implementation  
of Quality Improvement Program in 10 apparel firms

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German Technical Cooperation  
SME Financing and Development Project  
B-5/1, Safdarjung Enclave, New Delhi - 110 029, India  
Tel: +91 11 2671 5952 / 5826  
Fax: +91 11 2616 6844  
E-mail: amit.kumar@gtz.de, kultar.verma@gtz.de  
Website: www.gtz.de

Author  
Dr. Rajesh Bheda, Principal & CEO  
Rajesh Bheda Consulting

Responsible:

Amit Kumar

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# Abbreviations

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AQL	Acceptable Quality Level
COQ	Cost of Quality
DFID	Department for International Development
DHU	Defects per Hundred Units
GOI	Government of India
GTZ	German Technical Cooperation
KFW	Kreditanstalt für Wiederaufbau (Reconstruction Credit Institute)
MSMEs	Micro, Small and Medium Enterprises
OGTC	Okhla Garment and Textiles Cluster
PDCA	Plan Do Check Act
QIP	Quality Improvement Program
RBC	Rajesh Bheda Consulting
SIDBI	Small Industries Development Bank of India
SMEs	Small and Medium Enterprises
SPC	Statistical Process Control
SQC	Statistical Quality Control



# 1. Background and Framework Condition

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The Government of India (GOI), through the Ministry of Finance, is working with a multi-donor consortium to implement “Small and Medium Enterprise Financing and Development Project”. World Bank, KFW, DFID, and GTZ are the participating agencies. The objective of the Multi-Donor Project is to strengthen growth and competitiveness of micro, small and medium enterprises (MSMEs), by improving their access to market-oriented financial and business development services.

German Technical Cooperation (GTZ) is implementing its program of technical assistance in close cooperation with SIDBI and Apparel is one of the subsectors supported by GTZ. Based on the consultative and participatory discussion with all stakeholders an urgent need to improve productivity, quality and systems in garment manufacturing factories was identified as key bottleneck to enhance its competitiveness and employment potential. In the fast changing global business environment, where there is constant pressure on lead time & pricing, the way forward for apparel MSMEs is to improve efficiency, cut the cost by better quality, waste reduction and other means. However the non conforming quality (defect) level in the apparel industry is quite high.

In order to develop a deeper understanding amongst the apparel manufacturing MSMEs and appreciation regarding need for undertaking the improvement measures and thus reducing repair and rejection cost and attaining world class quality, GTZ facilitated implementation of **Quality Improvement Program (QIP)** in select apparel manufacturing SMEs in NCR as a pilot measure. QIP has been implemented in association with Okhla Garment and Textiles Cluster (OGTC) by Prof. Rajesh Bheda, CEO Rajesh Bheda Consulting.





## 2. Cost of Poor Quality: An Introduction

Though the Indian apparel industry has made efforts towards controlling the outgoing quality of the merchandise; the 'right first time' quality level in various manufacturing processes needs substantial improvement. The repair and rejection levels in the Indian apparel manufacturing firms still remain quite high compared to best practice firms in Asia including India.

The majority of time and effort of the quality personnel of apparel manufacturers seem to be devoted to inspecting the already produced merchandise than preventing the defects from arising. This phenomenon can mainly be attributed to the non-understanding of the 'Cost of Quality' or in simple words non-understanding of the amount of money wasted due to poor quality.

According to Joseph Juran, a leading Guru of Quality:

**“Cost of poor quality consists of those costs that would disappear if our products and processes were perfect.”**

For the purpose of better understanding and control, the cost of quality is classified in four categories namely Prevention Cost, Appraisal Cost, Internal Failure Cost and External Failure Cost.

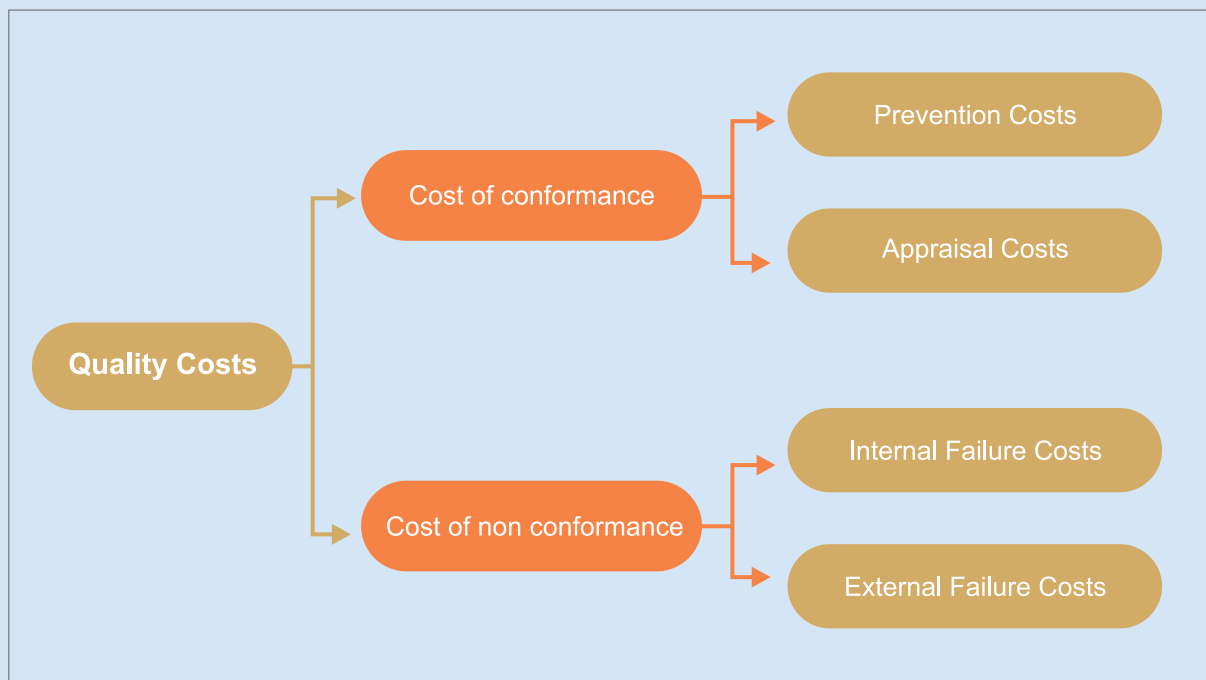


Figure 2.1: Classification of Cost of Quality

A first of its kind study '**Cost of Quality in the Indian Apparel industry**', supported by Ministry of Commerce, Govt. of India, carried out by Dr Rajesh Bheda brought out some startling revelations. The study that covered 61 apparel manufacturers from important manufacturing hubs of the country, established that:

- Average Cost of quality among the participating factories was 14.05% of their sales turnover. In some factories the cost of quality was as high as 30% of sales.
- The study also revealed that on average the companies spent only 0.26% of sales towards the Prevention cost. The Appraisal cost was 3.31% of sales where as the Internal Failure Cost was the highest at 9.86% of sales.

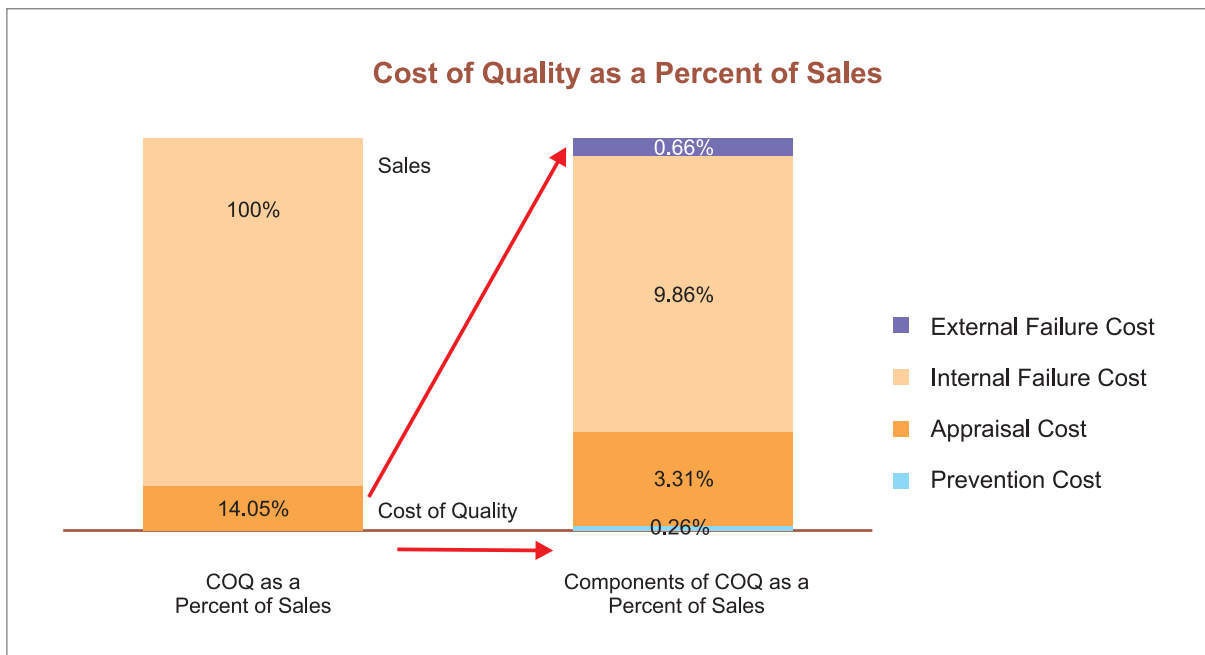


Figure 2.2- Average Cost of Quality as a percent of sales in Indian Apparel industry

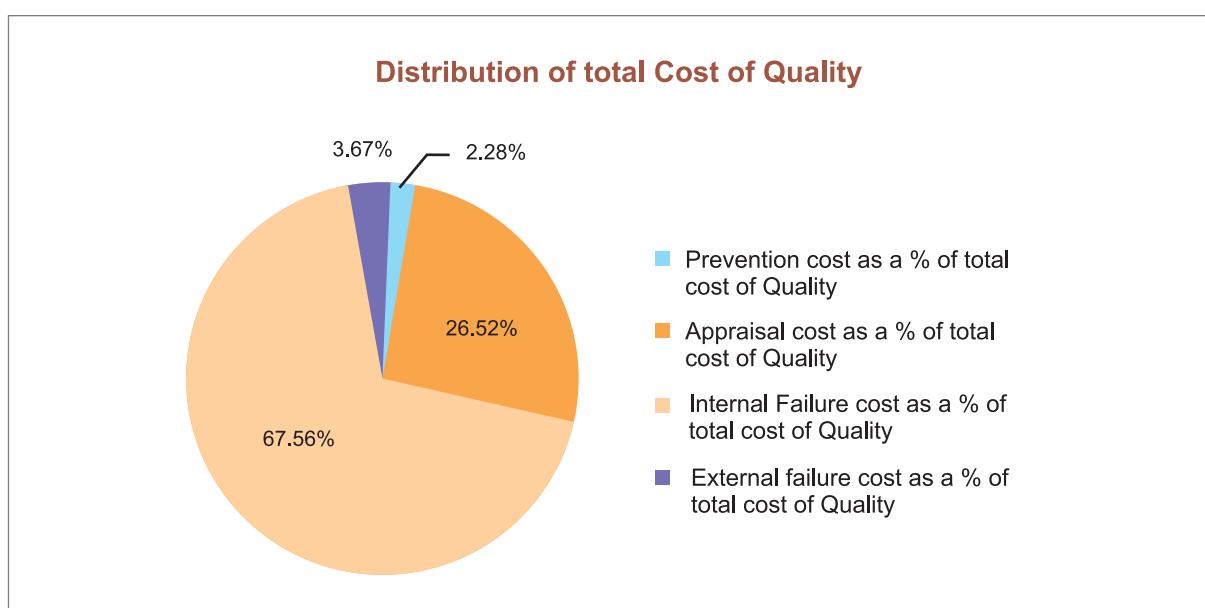


Figure 2.3- Distribution of cost of Quality in Indian Apparel Industry

It was concluded that the cost of quality in the Indian apparel industry was too high to be neglected. There was an urgent need for investment in prevention of defect generation, improvement in effectiveness of inspection and testing in apparel industry.

In the current environment where there is a high pressure for reducing the selling price of export apparel, reduction in COQ could play a significant role in retaining the competitive advantage while maintaining profitability of the industry.

The findings of this research and subsequent assessment of Cost of Quality in four members of Okhla Garment and Textile Cluster by Dr. Rajesh Bheda generated keen interest among the member factories to embark upon the journey of Quality Improvement Program (QIP). The support under SME Financing & Development Project implemented by GTZ provided the much needed environment for project initiation. More information about the implementation approach of the QIP is explained in chapter 5.

The study further concluded that reducing the Cost of Quality from 14% to 6% of sales can improve the profitability of Indian apparel manufacturers by almost 50%.



# 3. Profiting Through Quality: Key Results of QIP Implementation

The results of the implementation of quality improvement program have been very encouraging. The factory teams were very excited about their achievements and vowed to carry forward the implementation to march on the path of continual improvement. Some of the key results of the program are as stated below:

## 3.1 Fall in Defect Rate

The **Right first Time quality level** of the participating factories improved substantially. The reduction in the defect rates at the End of sewing lines ranged from 19.94 % to 78.6% with an average reduction of 49.83% (fig 3.1). As also can be seen in figure 3.2 an 3.3 the implementation of QIP resulted in steep fall in the defect rates among the participating factories.

**Apart from sewing department, the participating factories also experienced steep fall in the defect rates in pattern making, cutting and finishing departments to the tune of 20% to 75%.**

- In one factory the measurement inaccuracy rate in patterns went down by over 75%
- In another factory Cutting audit failure rate went down from about 20% to 3%

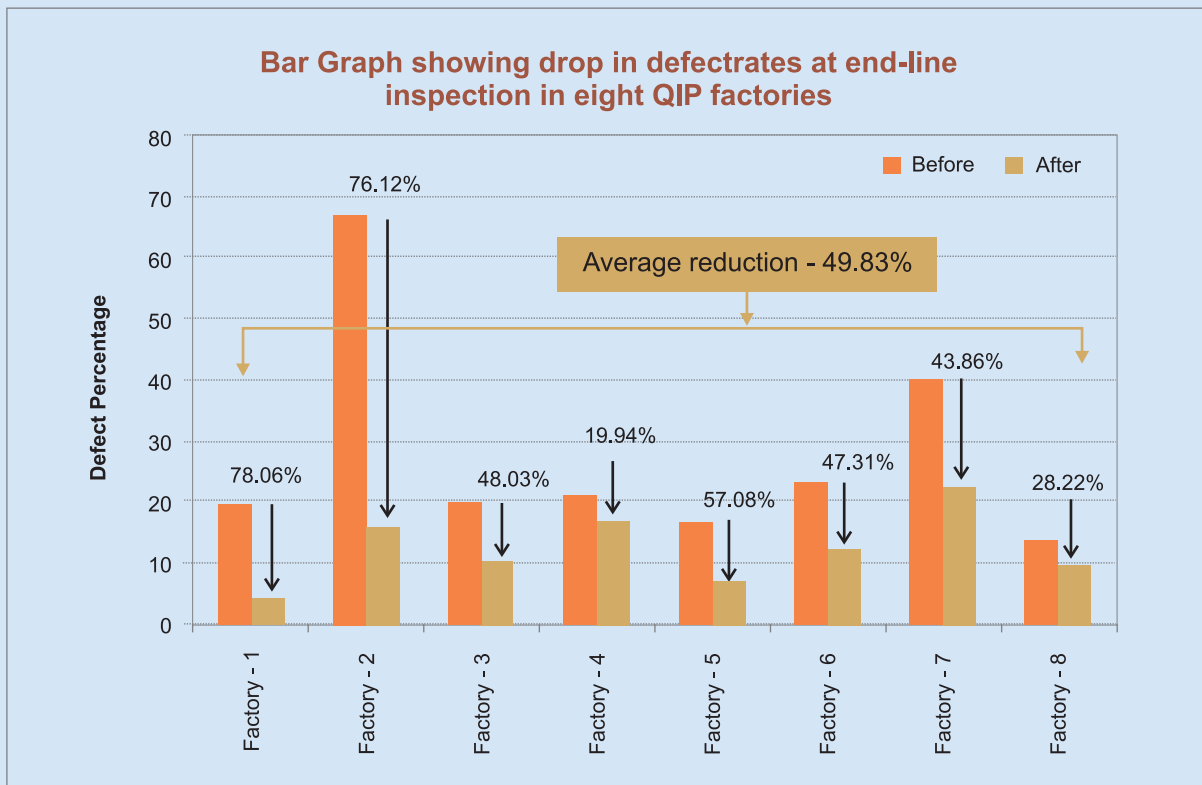


Figure 3.1- Graph showing Decline in Defect rates in End-line inspection post implementation of QIP in Eight Different Factories

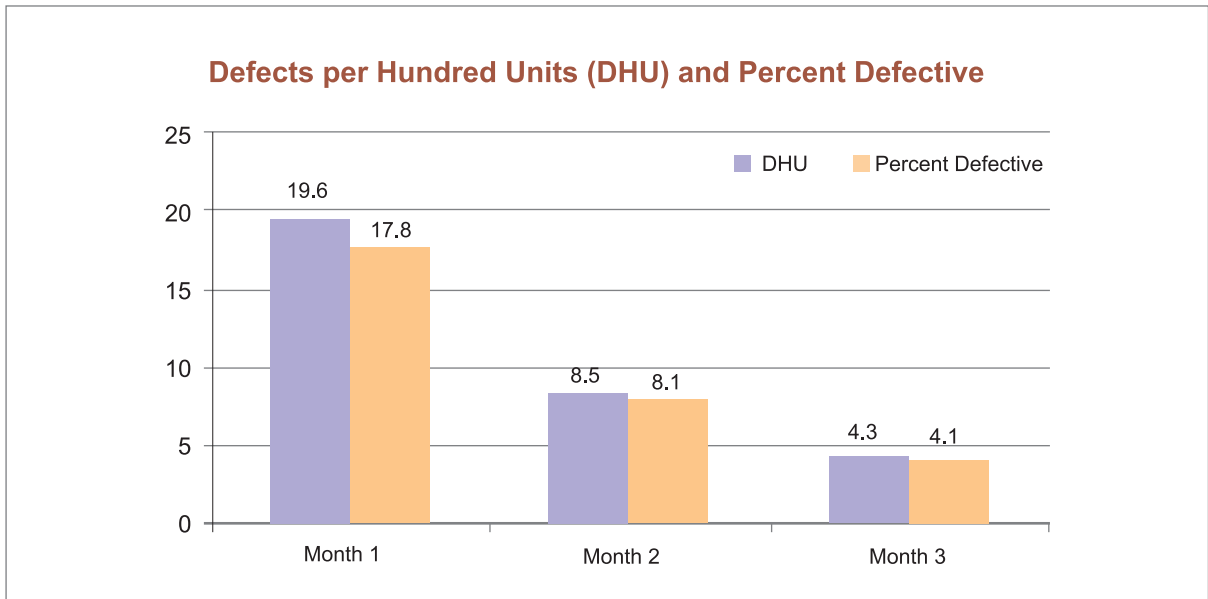


Figure 3.2- Bar graph Showing Decline in DHU and Percent Defective over a period of 3 months

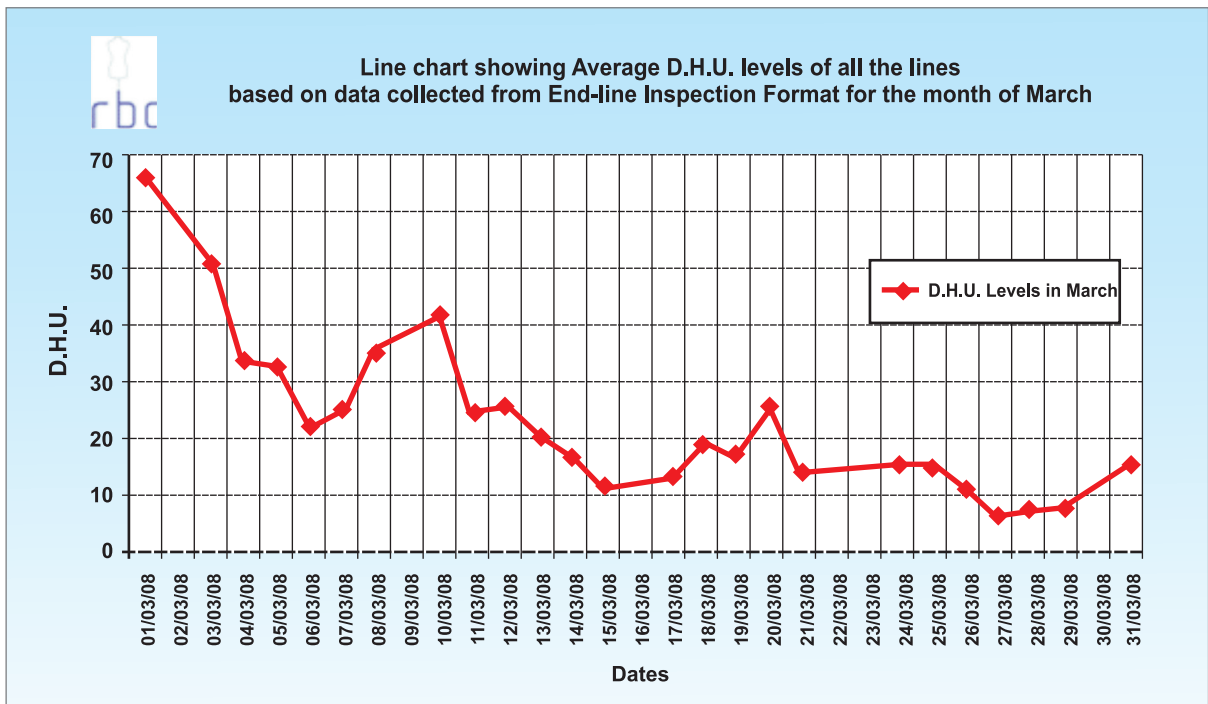


Figure 3.3- Trend chart showing decline in DHU and Percent Defective over a period of 1 month

### 3.2 Payback Period

The Cost Benefit Analysis showed estimated monthly savings of above Rs. 75000 to Rs. 225000 depending on scale of operations and improvements achieved. This has resulted in impressive payback period of two to five months. In some cases the program paid back during the implementation period itself.

### 3.3 Customer Feedback

International customers of many participating companies have appreciated the systems introduced through the QIP and have upgraded the factory rating formally or informally. In one case a leading European retailer has exempted the factory from the final inspection by their quality auditors. Some factories have reported that new customers appreciated their quality system and thus it helped them securing higher value business.

### 3.4 Improved Subcontractors

The improvements experienced are not limited to the participating factories alone. In many cases their subcontractors have also benefited from the best practices of the program. In one case, the average defect rates of seven subcontract manufacturers went down by 40.76%, While the highest rate of defect reduction was 71.32%.

### 3.5 Reduction in consumables and Environmental Impact

One of the participating factories has reported substantial reduction in chemical consumption (by over 74%) as a result of reduction in the stains. The factory had managed to bring down the stains by about 67% (figure 3.5) through problem solving approach and improved housekeeping.

The factory also reported reduction in the consumption of water, fuel and electricity during QIP implementation leading to major cost savings and more importantly, reducing adverse impact on the environment. This consequently has encouraged other factories to explore this opportunity area.



Figure 3.4- Graphs Showing Reduction in Stains per hundred garment and reduction in cost of stain removing chemical after the implementation of QIP

### 3.6 Interdepartmental Team Spirit

All participating factories have reported improved interdepartmental team spirit, communication, coordination and overall motivation level of the work force.

### 3.7 Decision Making and Problem Solving

The factory teams have developed greater confidence in fact based decision making and problem solving ability. They further reported improvement in their knowledge and skills and their ability to apply the same in their processes to bring in improvements.

### 3.8 Training

During the program a total of 324 personnel from the 10 participating factories benefitted from the training provided by Rajesh Bheda Consulting. Out of these participants 103 were managers, 97 were supervisors from various departments and remaining 124 belonged to quality controller/checker category.

In addition to this the factory team members trained by RBC, conducted several training sessions for the workers to spread the awareness of Right First Time Quality to grass root level.



*Figure 3.5- A factory team training session*



## 4. Case Studies

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**“There is one rule for the industrialist and that is: Make the best quality of goods possible at the lowest cost possible, paying the highest wages possible.”**

**Henry Ford (1863-1947), American industrialist**

The collaborative journey of implementation of Quality Improvement Program in the apparel manufacturing MSMEs has been truly rewarding for all the partners, namely GTZ, Okhla Garment and Textile Cluster, participating apparel manufacturers and Rajesh Bheda Consulting. Though the focus of the program was on improving Right First Time Quality level in core manufacturing processes like cutting, sewing and finishing; and the program resulted in substantial improvements in these processes; the program also resulted in significant improvements in other processes as well.

As the program was implemented in a flexible manner to suit the needs of each participating factory, wide variety of processes and opportunity areas received attention of RBC consultants thus resulting in sizable improvements.

One of the main objectives of the pilot implementation of the QIP was to create a demo effect about the value of using consultancy services to establish Quality Systems. This section of the publication aims at sharing with the wider industry community some of the real-life case studies emerging from the QIP implementation. The themes covered are:

- 1) Improved coordination between merchandising and production team
- 2) Interdepartmental team spirit and cooperation
- 3) Reduction in stains in Garments
- 4) Improvement in subcontracted sewing quality
- 5) Improvement in sewing quality
- 6) Fabric inspection system
- 7) Internal Customer feedback mechanism.

## 4.1 Improved Coordination between Merchandising and Production Team

### The Challenge

The communication and coordination between the merchandising and the factory team was unsatisfactory. Due to this the mutual trust and cooperation was also limited.

This led to frequent delays in order shipments and client team needed to engage in extra communication with buying agencies for last minute changes or approvals. The factory also experienced high rejection rate and had to do excessive overtime to meet the shipment dates.

### The Client

The client is one of India's leading garment export houses. Its customers include reputed retail stores in the US, UK, Sweden, Holland, Canada and Australasia. The company manufactures high fashion ladies apparel, ranging from casual outfits to formal evening wear. All the factories of the company are ISO 9000 certified.

### The Solution

- Consultative sessions were organised between the factory team and merchandising team, to explain the internal customer supplier relation and the need for improved coordination and synergising the working of both entities with organisational objective in focus
- Facilitated each factory team to identify five improvements in the working of their department and found out improvement expectations from their internal customer departments

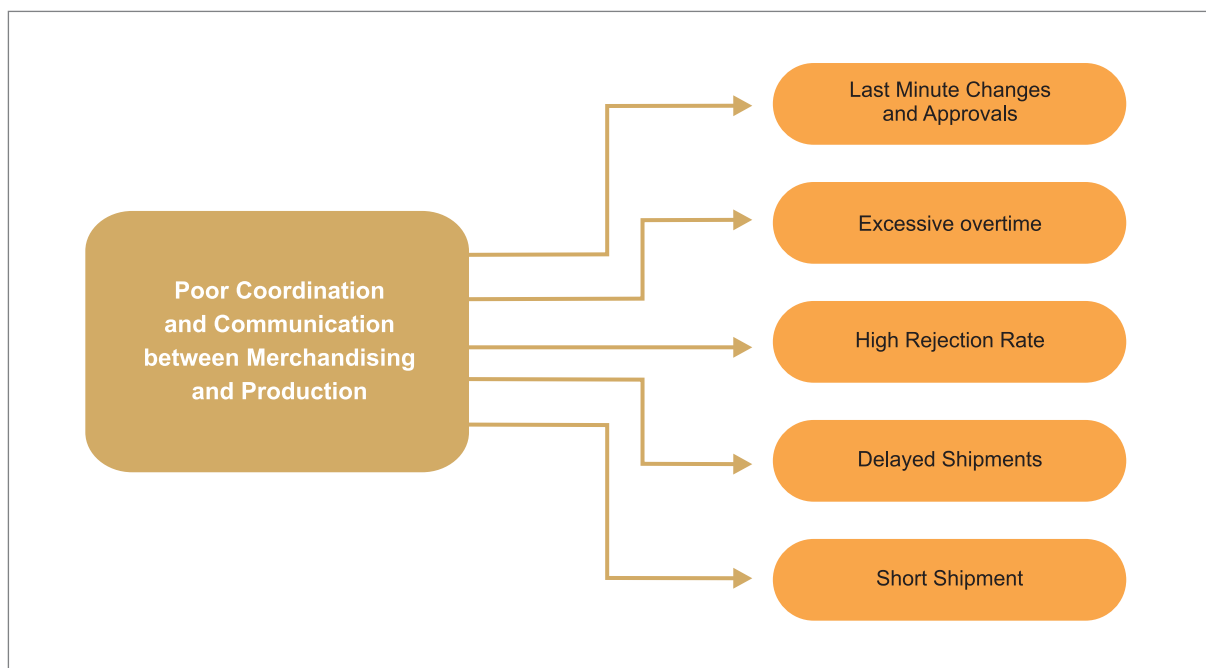


Figure4.1.1- Major Challenge and its effects

- Based on these the factory teams initiated improvement projects to meet the internal customer expectations.
- Systematic problem solving efforts by the factory team under the guidance resulted in solving long pending issues, reduce defects and delays.

**The Business Impact:**

The overall rejection rate of the garments has gone down by almost 50% i.e. from 4% to less than 2%. This has sizable positive impact on the profitability of the organisation apart from several other benefits.

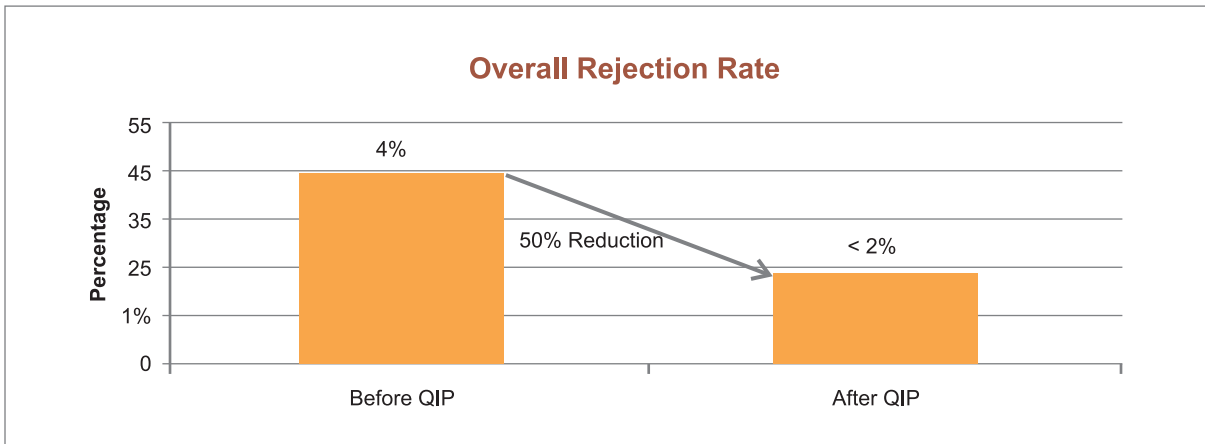


Figure 4.1.2- Decline in the overall rejection rate post implementation of QIP

**Other Benefits**

The QIP has resulted in improved trust, mutual understanding and cooperation between the merchandising and factory team. From mostly short shipments, in large cases, the factory has started sending shipments with excess quantity. The shipment delays have gone down substantially. This has led to improved factory image among the customers.

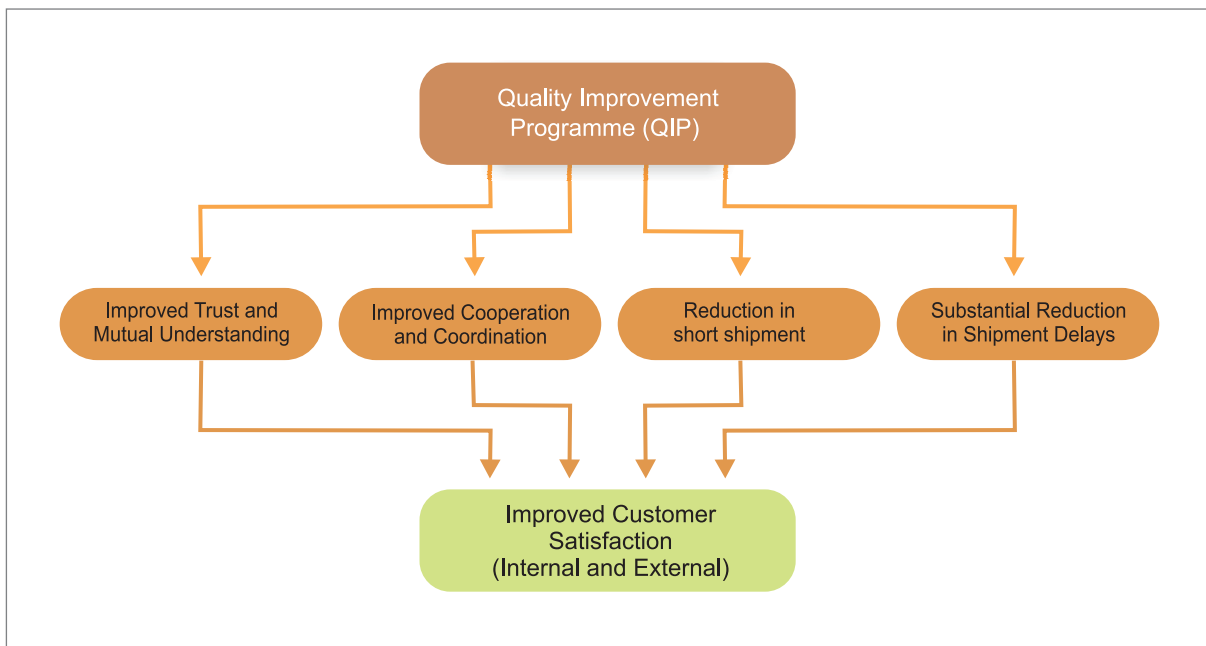


Figure 4.1.3- The benefits obtained by the factory from QIP

## 4.2. Interdepartmental Team Spirit and Cooperation

### The Challenge

The different departments of the factory believed that in spite of their best efforts the quality problems were not eliminated because other departments did not do their job right. Though the factory team understood the importance of serving the ultimate customer with desired quality, they lacked internal customer orientation. In many cases they blamed internal customers of being 'habitual complainants'.

Quality and production teams suspected each others' intentions. The challenge was to bring in the common goal of 'external customer satisfaction through company-wide internal customer satisfaction'.

### The Client

The client produces value added ladies wear for the US and European market. The company has a strong product development team. Most of the business of the client is directly handled with international retailers/importers without involvement of buying agents or local sourcing offices.

### The Solutions

After the initial training on the fundamental concepts of Right First Time quality and the utmost relevance of the concept, consultants conducted a series of sessions between internal customer supplier departments to understand the expectations of the internal customers.

This was followed by initiation of small improvement projects in each department with the aim of satisfying the internal customer department. 30 such projects were initiated.

The progress of these projects was regularly monitored and discussed during the QIP Core Team meeting on weekly basis.

### The Business Impact:

20 out of the 30 project initiated were successfully completed during the implementation of the Quality Improvement Program in the company. As a result of successful implementation of these projects and regular progress review, all the departments of the factory developed greater confidence and trust in other departments. This brought in transparency, greater appreciation of issues involved, and inter-departmental team work and over a period of time the factory teams developed ability to solve problems through collective brainstorming and data based decision making. No doubt the factory was handsomely rewarded with reduction in rejection rate by almost 50% resulting in substantial cost savings.

The key outcomes were:

Outcomes	Percentage
Reduction in defect rate in patterns	75%
Reduction in cutting room Audit Failure	85%
Reduction in defect rate at endline inspection	66%
Reduction in overall rejection rate	50%

Table 4.2.1- Key outcomes of the QIP implementation

## 4.3. Reduction in Stains on the garment

### The Challenge

Alongside the problems of high repair level in sewing the client also faced substantially high level of stains in the garments. This meant a lot of additional work in the finishing department to remove stains. This also meant excessive cost of stain removing chemicals. The challenge was to find out the sources of the stains, establish to root causes to take preventive actions.

### The Client

The client is an Okhla based manufacturer, exporting to the European Market. The company is managed by the owner with the help of experienced staff in a family like manner. The company deals with small order quantities and high style variation. Stitching and embroidery is totally outsourced.

### The Solutions

- The finishing team was trained in data capturing tools like check sheets to understand the frequency of stain related problems. The data collected by the finishing team showed that every 100 garments inspected had on an average 46.13 stains.
- The factory team was encouraged to use problem solving techniques to understand the root causes of various defects found in the garments. Suggestions were invited from the employees on how to protect the garments from stains during various processes
- The employees as well as sub-contractors were sensitised to the problems of stains, the precautionary measures were implemented and results were monitored on regular basis.



Figure 4.3.1- Graphs Showing Reduction in Stains per hundred garment and reduction in cost of stain removing chemical after the implementation of QIP

## **The Business Impact**

The project resulted in impressive impact for the client

Stains per hundred garments went down by 63% from 46.13 to 17.02 while the cost of stain removing chemical garment reduced by 74% from Rs. 1.38 to Rs. 0.5 per piece.

Most importantly, the reduction in stain became one of the important factors contributing to more than doubling the productivity of the finishing department.

Cost of power, water and fuel went down by Rs. 2.00 per piece.

**“A strong foundation has been laid in these three months  
for working towards improvement”**

**-Factory owner, Indigo Apparel**

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**“Some of our long pending issues have been resolved as a result of  
Cause and Effect Analysis implementation.”**

**- Fabric Store In charge, Indigo Apparel**

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**“First time we have realized the importance of data for the work  
what had been accomplished and its usage in understanding the situation  
of the merchandise”**

**- Finishing floor in charge, Super Fashions**

## 4.4. Improvement in subcontracted sewing Quality

### The Challenge

The management of the company was though convinced of the possible gains from QIP methodology and its value but was unsure about the program's implementation in high fashion, small quantity manufacturing. Since all stitching in this factory is outsourced, the challenge was to improve the subcontractors that they could and needed to produce better quality apparel without expecting increase in sewing charges.

### The Client

The client is an Okhla based manufacturer, exporting to the European Market. The company is managed by the owner with the help of experienced staff in a family like manner. The company deals with small order quantities and high style variation. Stitching and embroidery is totally outsourced. The factory works with about 15-20 fabrication (stitching) units.

### Solution

- An interactive session was organized with subcontractors to explain to them the importance of right first time quality and understand the difficulties faced by them in achieving so.
- They were explained with simple examples how they will be able to save time and money by producing defect free garments in the first attempt.
- The factory provided a detailed objective feedback on sewing quality to sub contractors detailing the type and frequency of defects generated by the tailors. This was useful in explaining the tailors the specific improvements needed in their work.

### Business Impact

The client saw breakthrough results in terms of reduction in defect rates in the garments stitched by the sub contractors. An average reduction in defect rates for seven main fabricators was reported to be 40.76%. As can be seen in the graph the maximum reduction was 71.32% where as minimum reduction was 19.02%.

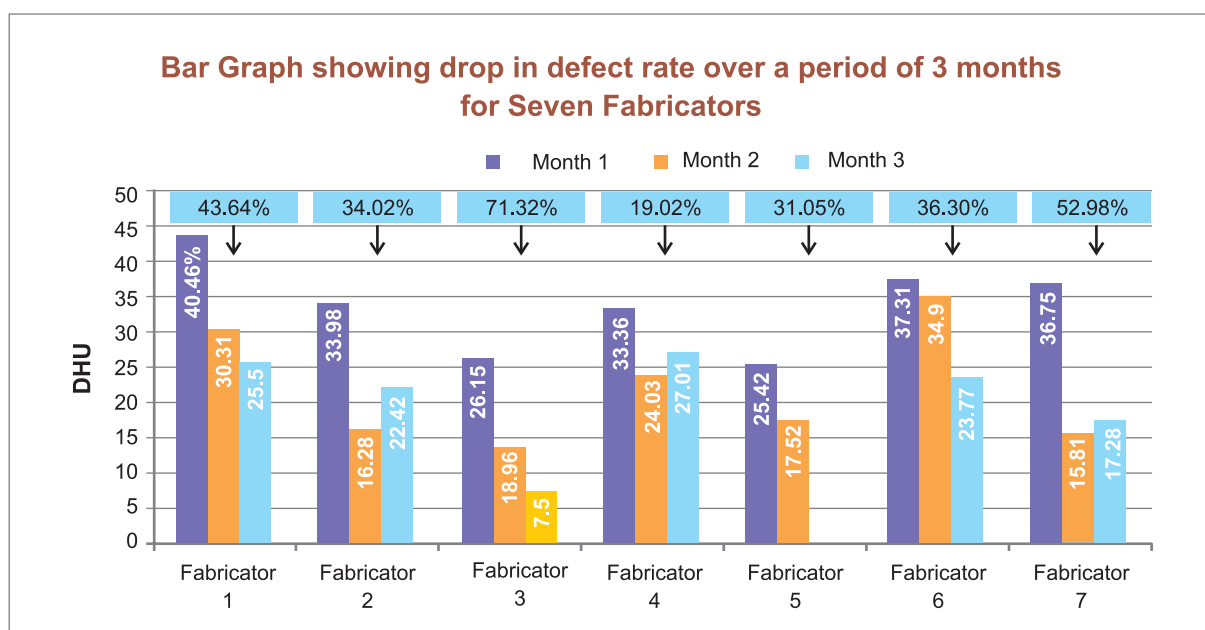


Figure 4.4.1- Drop in defect rate of seven fabricators over a period of 3 months

## 4.5. Improvement in Sewing Quality

### The Challenge

It was observed that rework level at production floor due to stitching defects was quite high. This led to time and energy loss of production line operators and supervisors. Further the finishing department had to do high amount of sewing related rework to complete the shipment

### The Client

The NCR based client works with leading international names such as Reebok, May Department Stores, Chico's, Urban Outfitters and Anthropology. The client produces knitted apparel for men, women and kids. The product range involves blouses, tops, skirts, Polo shirt, t-shirt and track pants. The quality system of the factory is certified under ISO 9001:2000.

### Intervention

- An interactive session for the production and quality team was conducted to explain to them the importance of 'right first time quality' for hurdle free production.
- RBC's end-line inspection data capturing format was introduced to understand existing defects and their frequency.
- The stitching operators were also explained the importance of 'right first time quality' and how they will be able to improve their earning by eliminating defects.
- Training sessions on data analysis, 'problem solving' and 'daily management' were conducted by consultants to eliminate the defects from the roots.
- RBC's Quality Management Information System was installed to generate management reporting.

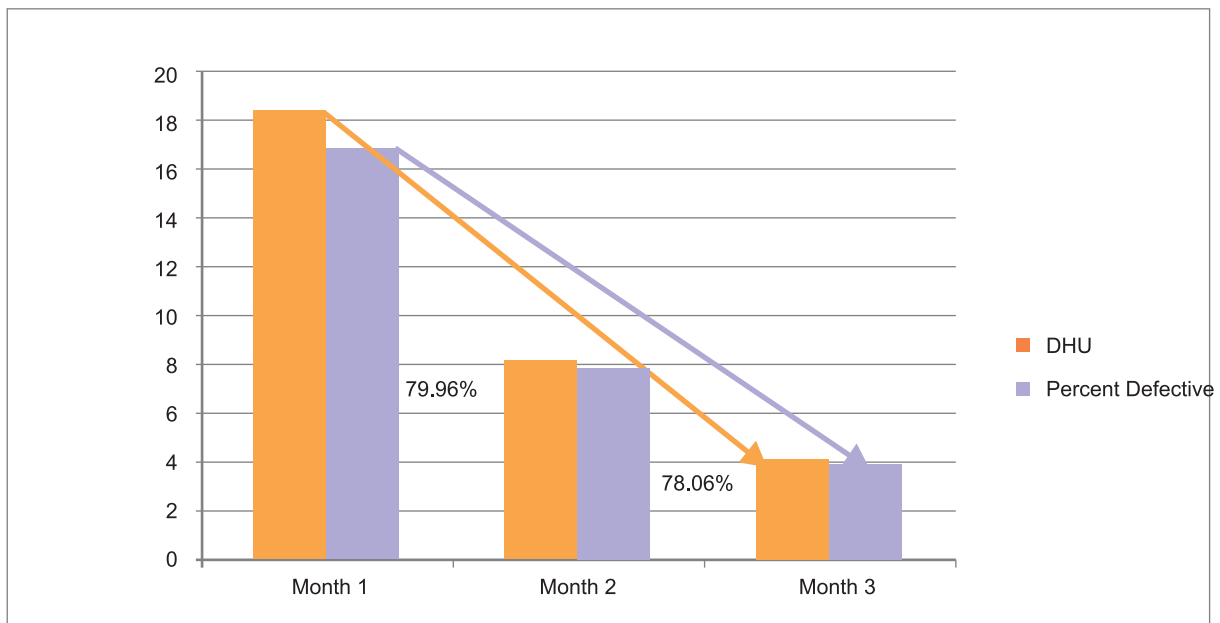


Figure 4.5.1- Reduction in DHU=78.06% and a reduction in Percentage Defective=79.96%



## **Business Impact**

The defect rate of the stitching floor came down by 78.06% over three months period.

As a result of improved sewing quality the company decided to eliminate quality audit before sending the merchandise to finishing department. This resulted in redeployment of five inspection staff. Needless to say the project resulted in substantial cost savings for the factory.

“We are enjoying the life-time opportunity from learning the quality management systems in workplace as well as in our personal life.”

– **An end-line checker, Super Fashions**

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“Stitching quality has substantially improved than earlier”

-**Finishing Manager, Super Fashion**

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“I am glad to see good results of sustainable reduction of alteration in stitching in such high pressure time, I am sure we will perform better in the coming time”

- **Factory Manager, Super Fashions**

## 4.6. Fabric Inspection System

### The Challenge

The challenge was to introduce a fact based, objective fabric quality inspection system so as to create the basis for fabric quality improvement.

The cost of fabric constitutes about 50% to 60% of the garment cost. The popular perception in the North Indian apparel industry is that their biggest problem is delay in fabric delivery and poor or unpredictable quality of the fabric. It is also widely perceived that the fabric processors and suppliers are not too keen to engage in quality improvement actions and it is a sellers' market.

### The Clients

This case integrates experiences from three participating factories of QIP. All of them produce relatively small order qualities mainly for the European market. Garments produced by them involve multiple processes and fabric types vary significantly.

### The Solutions

- The fabric department team was sensitised to the need to have factual and objective data on the fabric quality
- Once they were convinced about the value of introducing an internationally acceptable fabric inspection procedure, Four Point System of fabric inspection was introduced in the participating factories

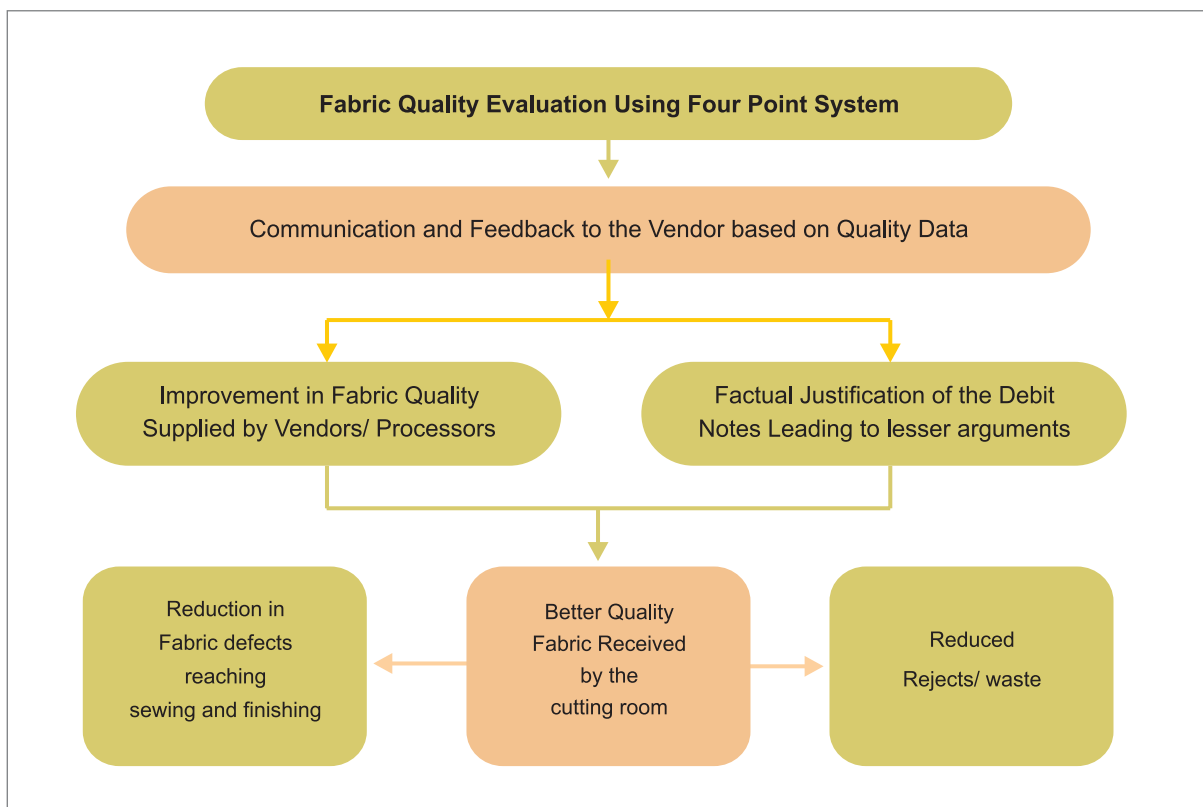


Figure 4.6.1- Benefits from effective use of fabric Quality performance data based on 4-point system

- After introduction of the system, fabric team was trained in analysing delivery and quality performance of different fabric suppliers/ processors
- The factories started providing written feedback to fabric vendors with their comparative performance.
- This created a sense of competition and pressure on the fabric suppliers to take actions to improve the performance.

**The Business Impact:**

All the three factories have reported gradual improvement in fabric quality supplied by fabric vendors and processors after the introduction of the system. One factory reported that the arguments with suppliers relating to the justification of debit notes in case of the defective fabric have come to an end as a result of detailed inspection reports which clearly states the type and frequency of the defects found in the fabrics per roll. Cutting rooms of these companies have reported receiving of better fabric compared to pre-QIP days. This helped companies reduce if not eliminate fabric defects reaching sewing and finishing departments and resultant wastage.

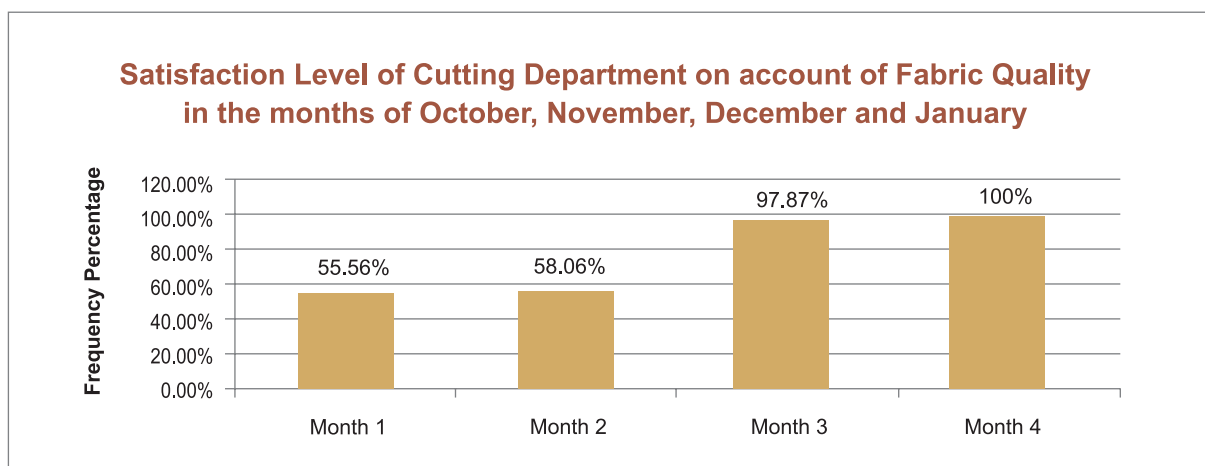


Figure 4.6.2-Satisfaction Level of Cutting department on account of fabric quality for 4 months

## 4.7. Internal customer feedback mechanism

### The Challenge

Though the factory had a very good performance at the stage of Final Quality Audits by their customers, the factory was experiencing high internal rework level. The management was concerned about the resultant cost of quality and delays. High internal rework also resulted in a tendency among the staff of pointing fingers when faced with problems. As a result, concept of collective responsibility and approach of working together to achieve common goals was low. The challenge was to establish objective feedback mechanism between the departments for reducing communication gap and initiating the process of continual improvement.

### The Client

The client is a leading exporter working with some of the fortune 500 retailers. The factory produces baby, kids and women's wear. Acknowledging the high 'Cost of Quality' and unseen losses incurred on account of it, the client decided to implement Quality Improvement Program. The quality system of the factory is certified under ISO 9001:2000.

### Intervention

After the introductory training on the concepts related to 'Right First Time quality' and data based decision making, the factory team was introduced to RBC's methodology of internal customer identification and understanding their expectations.

Once the departmental teams agreed to seek internal customer satisfaction level, the feedback mechanism was activated between internal customer and supplier departments.

The feedback of internal customers was regularly analysed and corrective actions were taken by the supplier departments. Regular interdepartmental meetings were conducted to review the progress made and issues that needed to be addressed on priority.

The factory management also started reviewing the daily feedback summary and encouraging the progress made as well as providing guidance wherever needed.

### Business Impact

Introduction of feedback mechanisms has helped each department to get timely feedback on their work and identify areas for improvement and avoiding repetition of mistakes. In case of cutting department, the adverse feedback reduced by 50%.

The improvement actions of departments resulted in higher internal customer satisfaction further leading to improved interdepartmental communication and understanding of the issues.

Mutual understanding, respect and professional appreciation of other departments has created better working environment.

Comments of factory team on initiating the feedback mechanism:

“This has helped me solve many of the quality and production issues.”

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**– Factory Manager**

“We have started waiting eagerly to know our performance through feedback mechanism.”

-----  
**– Production Manager**

“We are satisfied that the blame game has literally disappeared and we are happier working in co-ordination with fabric and stitching department”

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**- Cutting Room In charge**

“It has become easier for us to know the problem faced by production due to the system of feedback register”

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**-Cutting QA, Radnik Exports**

“I feel proud to show you my feedback register. We are being appreciated for the good work we are doing.”

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**- Cutting manager, Saivana Exports**

“The morale and motivation of my department has increased as good performance and improvement is applauded by the seniors “

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**Floor Incharge, Radnik Exports**



# 5. QIP : Planning and Implementation Approach

## 5.1 Planning:

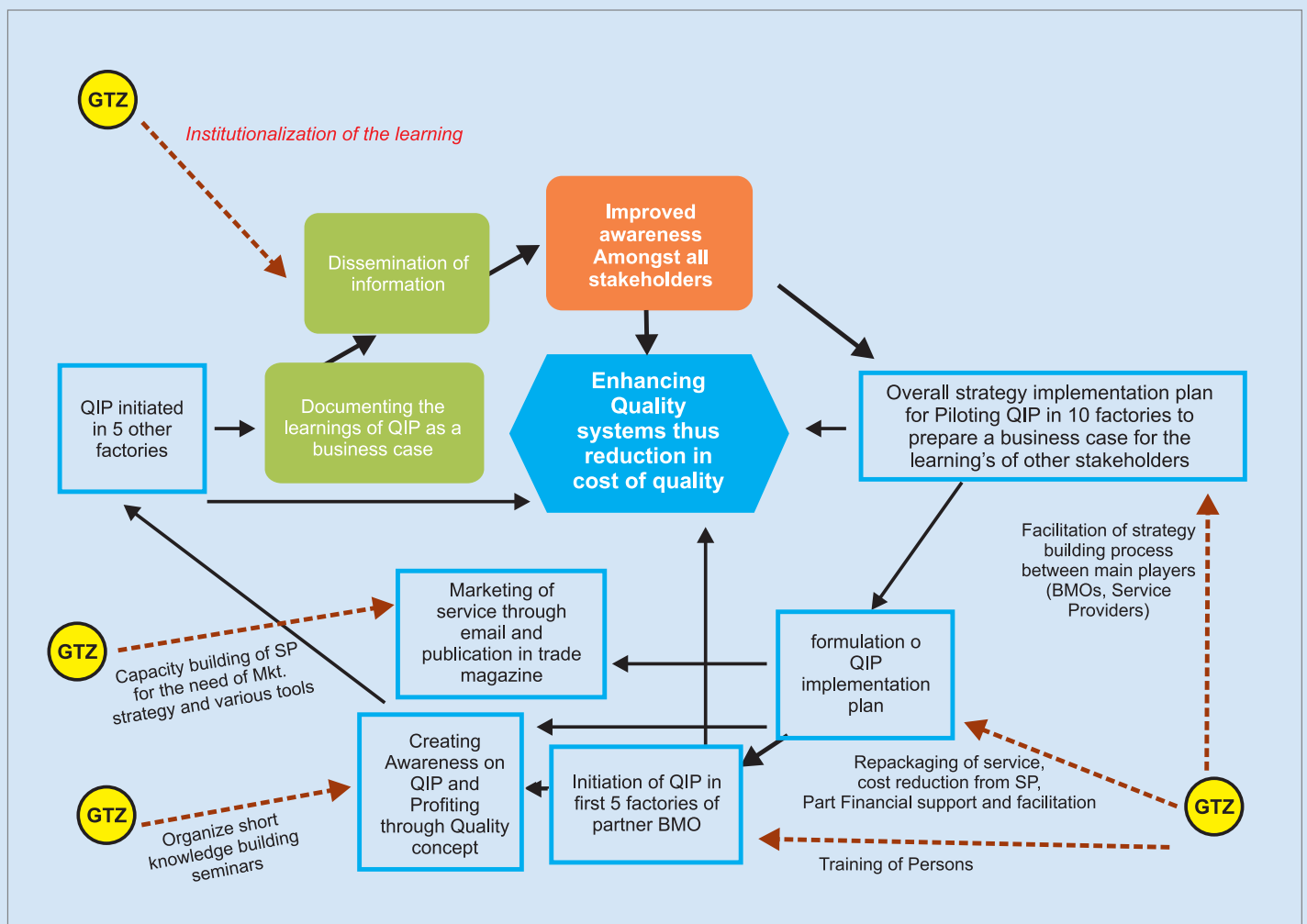


Figure 5.1- Planning Approach of QIP

## 5.2 Implementation Methodology

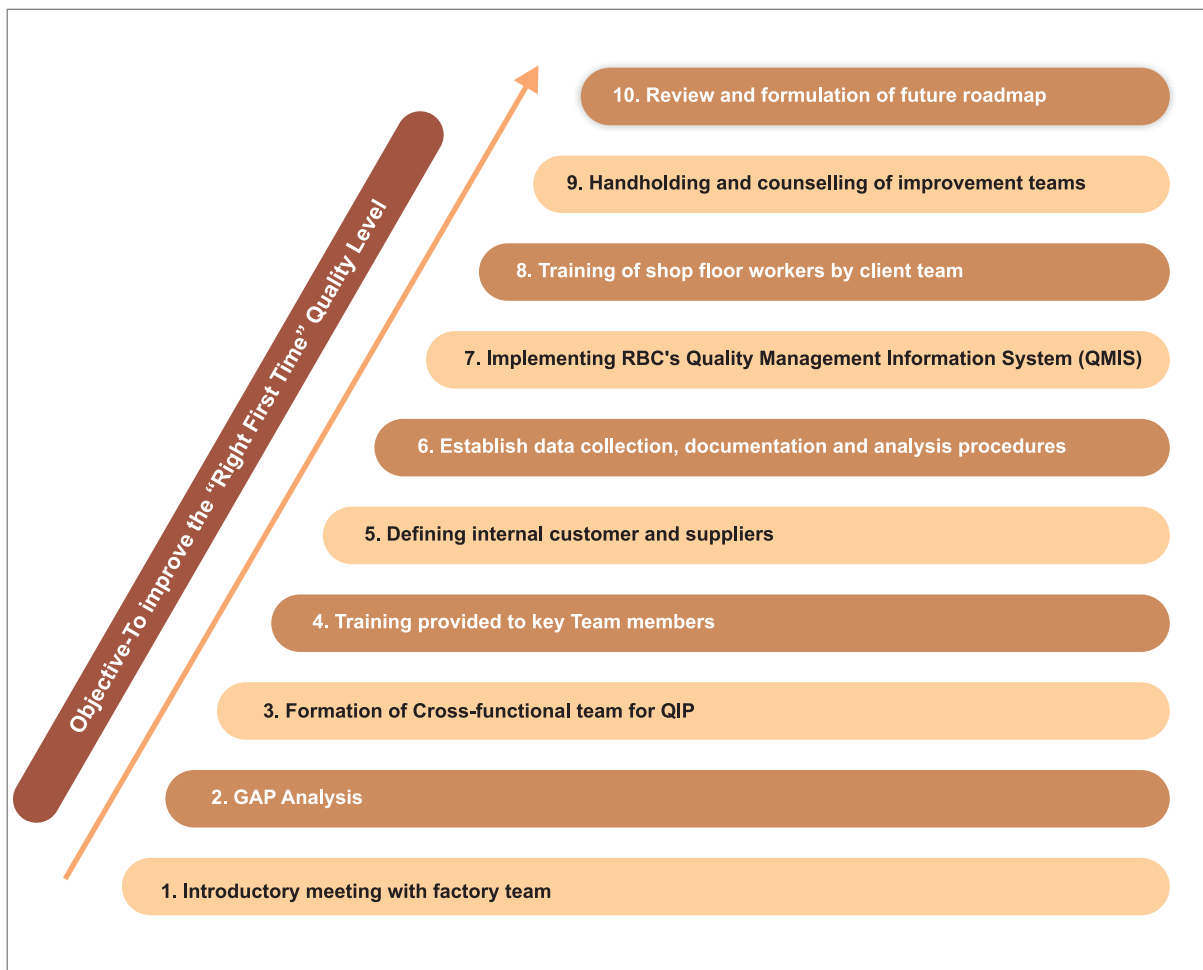


Figure 5.2- Quality Improvement Programme implementation Methodology

### • GAP Analysis : Critical Step

GAP analysis was carried out to assess the current systems and procedures, understand the defect levels and assessing the preparedness of the team for QIP. Based on the outcomes of GAP analysis the QIP implementation plan is adapted and fine-tuned to meet the specific need of the individual factory.

Some of the key findings of the Gap analysis were as follows:

- Extensive inspections were not effective in stopping the defective garments from moving forward to the next processes.
- There was a high success rate at buyer quality audit stage but this was achieved after high re-work level in sewing and finishing departments.
- In most cases the defect related data were under reported and not analysed.
- In some cases inspection did not give the clear picture as rework level related data were not available.
- Systematic problem solving was rarely practiced.



• **Formation of Cross-functional team for QIP**

A cross functional team was formed in each of the participating factory for the planning, implementation and review of the QIP.

• **Training provided to key Team members**

Training in the areas of fundamental concepts of Quality formed the main base of the Quality Improvement Program. The factory teams are encouraged to question the current processes and seek better alternatives. The specific training themes covered were: Customer Focus, Right First Time Quality, PDCA, AQL, Raw Material Inspection Systems, SQC, Cause and Effect Analysis, Data Analysis and Reporting System and other need based areas.



Figure 5.3: Components of the training provided to Key members



## 6. Technical Terms explained and put into context

1. **Appraisal Cost:** Cost incurred to determine the degree of conformance to quality requirements (measuring, evaluating or auditing). Example: Inspection, testing, process or service audits, calibration of measuring and test equipment.
2. **DHU (Defects per Hundred Units):** The ratio of number of defects per lot or sample, expressed as a percentage.

$$\text{DHU} = \text{Number of Defects} \times 100 \text{ divided by Number of Units.}$$

3. **External Failure Cost:** Cost associated with defects found after the customer receives the product or service. Example: processing customer complaint, customer return, warranty claim, product recall.
4. **GAP analysis:** Gap analysis is a business resource assessment tool enabling a company to compare its actual performance with its potential performance. At its core are two questions: “Where are we?” and “Where do we want to be?”
5. **Internal Failure Cost:** Cost associated with defects found before the customer receives the product or service. Example: Scrap, rework, re-inspection, re-testing, material review, material downgrades
6. **Pareto analysis:** Pareto analysis is a statistical technique in decision making that is used for selection of a limited number of tasks that produce significant overall effect. The purpose is to highlight the most important among a (typically large) set of factors. In quality control, the Pareto chart often represents the most common sources of defects, the highest occurring type of defect, or the most frequent reasons for customer complaints, etc.
7. **Percent Defective:** The ratio of defective pieces per lot or sample, expressed as a percentage.
8. **Prevention Cost:** Cost incurred to prevent (keep failure and appraisal cost to a minimum) poor quality. Example: New product review, quality planning, supplier surveys, process reviews, quality improvement teams, education and training.
9. **SPC (Statistical Process Control):** It is a method of monitoring a process through the use of control charts. Much of its power lies in the ability to monitor both process centre and its variation about that centre. By collecting data from samples at various points within the process, variations in the process that may affect the quality of the end product or service can be detected and corrected, thus reducing waste as well as the likelihood that problems will be passed on to the customer. With its emphasis on early detection and prevention of problems, SPC has a distinct advantage over quality methods, such as inspection, that apply resources to detecting and correcting problems in the end product or service.





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OGTC a cluster centric approach is the first of its kind with mission excellence as its motto. Though the members are not having physical proximity but are clear in their minds that success can only be achieved through collective thinking and cooperation. Like minded entrepreneurs got together and created OGTC to primarily strengthen each member by complementing each other, by identifying best practices, implementing intensive collective training and adopting out of the box approach and provide inputs as a think tank to the garment industry.

It is expected that OGTC initiatives in building competitiveness will create a demo effect for the industry and will lead to overall improvement and niche in the global arena. Quality management through QIP is one of the many initiatives undertaken by OGTC.

This programme has laid the foundation for advanced programmes in quality management so that first time right and right every time becomes a habit and eventually the culture of the company.

Mr. R.C.Kesar  
Director OGTC  
Email [ogtc@airtelmail.in](mailto:ogtc@airtelmail.in)  
Website [www.ogtc.in](http://www.ogtc.in)



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Rajesh Bheda Consulting (RBC) is a knowledge organization focused on enhancing competitiveness of the fashion industry organisations. it firmly believes that performance of the apparel manufacturing organisations can be significantly enhanced through overall productivity and quality improvement.

RBC has been working closely with many leading national and international players in the apparel sector with the purpose of bringing in productivity and quality improvements for achieving better produce and improved working conditions while retaining the cost competitiveness.

Founded by Prof. Rajesh Bheda, an expert on clothing manufacturing management, RBC is committed to make the industry aware of it's improvement potentials, draw strategies for improvement and guide them in achieving the potential

Dr. Rajesh Bheda  
CEO, RBC  
[drbheda@rajeshbheda.com](mailto:drbheda@rajeshbheda.com)  
[www.rajeshbheda.com](http://www.rajeshbheda.com)

SIDBI is the principal financial institution for the promotion, financing and development of industry in the small scale sector and to co- ordinate the functions of the institutions engaged in the promotion and financing or developing industry in the small scale sector and for matters connected therewith or incidental thereto.

SIDBI is the implementing agency for the SME Financing & Development Project. SIDBI has set up a project management division in New Delhi charged with smooth implementation of the project.



Incorporated in 1978, AEPC is the official body of apparel exporters in India that provides invaluable assistance to Indian exporters as well as importers/international buyers who choose India as their preferred sourcing destination for garments.

For Indian exporters, AEPC is quite literally a one-stop shop for information; advise, technical guidance, workforce and market intelligence. Members have access to updated trade statistics, potential markets, information on international fairs and assistance in participating at these fairs. It also plays a large role in identifying new markets and leading trade delegations to various countries.

In recent years AEPC has worked tirelessly in integrating the entire industry - starting at the grass root level of training the workforce and supplying a steady stream of man power to the industry; identifying the best countries to source machinery and other infrastructure and brokering several path breaking deals for its members and finally helping exporters to showcase their best at home fairs as well as be highly visible at international fairs the world over



India has been a partner country of German Development Cooperation for nearly 50 years. For almost all of this time, GTZ - Deutsche Gesellschaft fuer Technische Zusammenarbeit (GTZ) GmbH - has been active in India on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ).

Established in 1975, GTZ is organised as a private company owned by the German Federal Government. The BMZ is its major client. The company also operates on behalf of other German Ministries, partner-country governments and international clients such as the European Commission, the United Nations and the World Bank, as well as on behalf of private enterprises. It provides viable, forward-looking solutions for political, economic, ecological and social development in a globalised world.

To address India's development priorities of sustainable and inclusive growth, GTZ's joint efforts with the partners in India currently focus on three priority sectors: Energy, Sustainable Economic Development and Environmental policy, conservation and sustainable use of natural resources.





**SMALL INDUSTRIES DEVELOPMENT BANK OF INDIA**

Project Management Division  
Videocon Tower, Ground Floor  
E-1, Rani Jhansi Road,  
Jhandewalan Extension  
New Delhi-110055  
Tel: 011 - 23682474-77  
E-mail: pmd\_ndho@sidbi.com



**APPAREL EXPORT PROMOTION COUNCIL**

(Sponsored by Govt. of India. Ministry of Textiles)  
Apparel House, Sec 44,  
Industrial Area, Gurgaon - 122003, Haryana.  
Tel: 91-124-2708000-3  
E-mail: administrator@aepcindia.com



Deutsche Gesellschaft für  
Technische Zusammenarbeit (GTZ) GmbH

German Technical Cooperation  
SME Financing and Development Programme  
B-5/1, Safdarjung Enclave, New Delhi - 110 029, India  
Tel: +91 11 2671 5952 / 5826  
Fax: +91 11 2616 6844  
E-mail: amit.kumar@gtz.de, kultar.verma@gtz.de  
Website: www.gtz.de