

***Introduction to a JICA Support Project
for
Quality/Productivity Improvement***

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Introduction

It is a great honor for me today to talk about the JICA Support Project in Tunisia, which I have been involved with for two years since August 2006.

Before entering the main topic, I would like to say a few words.

For one and a half years from August 2001 to January 2003, I worked as team leader on the project for groundwater development and water supply training that is still being implemented today by JICA and the Ethiopian Ministry of Water Resources Development. In this project, I worked together with members of the Ministry of Water Resources Development to provide local government officials from the provinces of Ethiopia with training courses in such topics as groundwater prospecting, drilling, machine maintenance, social development and so on at the current Ethiopia Water Technology Center on the outskirts of Addis Ababa. My participation in this project (of groundwater development and water supply to rural people), which is extremely important for Ethiopia, is a great source of pride and a valuable page in my own life.

When I left Ethiopia in January 2003, I thought that I might never return, so I am delighted to be able to visit your country again in this way.

1) Senior Industrial Consultant, Japan Development Service Co., Ltd., Tokyo, Japan

Now I would like to talk about the Study on Master Plan for Quality/Productivity Improvement in the Republic of Tunisia. I hope this project case offers some useful information for promoting quality and productivity improvement in Ethiopian industry too.

1. Project Case Introduction: Study on Master Plan for Quality/Productivity Improvement in the Republic of Tunisia

1.1 Objective and Background of the Project

<Objective of the Project>

The objective of the project was to formulate a comprehensive master plan and action plan including the institution building for the quality and productivity improvement in the industries of Tunisia.

<Background and Course of the Project>

Following the conclusion of a partnership agreement between Tunisia and the European Union (EU) in 1995, Tunisia and the EU agreed to abolish tariff barriers by 2008. With this in mind, Tunisia has been striving to bolster the international competitiveness of domestic industries since 1995. The EU too has provided support regarding the acquisition of international standard certification including ISO 9000 series, HACCP²⁾, etc. geared to improving the quality of Tunisian enterprises and thereby enhancing the competitiveness of Tunisian industries. As you are aware, ISO9001 places requirements on the establishment of procedures (decision of work methods), documentation (compilation of work methods into documents) and recording (retention of records of work results) for quality management. However, simply acquiring ISO9001 does not necessarily mean that quality will automatically improve or that productivity will be enhanced. Realizing this, the Tunisian Ministry of Industry, Energy and SMEs requested cooperation in this field from Japan, which has gained worldwide attention for its successful industrial growth based on development of unique methods and techniques of quality control and production management³⁾.

<Counterpart Agencies>

The JICA counterpart agencies were the Ministry of Industry, Energy and SMEs (MIEPME) and the National Quality Programme Unit (UGPQ), while the counterparts (C/Ps) of the JICA consultant team were the technical staff of the public Technical Centers⁴⁾ under the MIEPME.

2) Hazard analysis critical control point

3) Differences between the EU approach and JICA approach to quality/productivity improvement in Tunisia are described in the following paper: Tsuyoshi Kikuchi, "The Quality and Productivity Improvement Project in Tunisia: A Comparison of Japanese and EU Approaches," *Diversity and Complementarity in Development Aid-East Asian Lessons for African Growth*, edited and published by GRIPS Development Forum, 2008.

4) The Ministry of Industry, Energy and SMEs (MIEPME) has public technical centers in each industrial sector. In the project, five technical staff members participated as counterparts from CETIME (electric and electronic and machinery sector) and CTAA (food processing sector).

1.2 Study Activities

This project was implemented over two years, starting in August 2006 and ending in July this year. During this time, the JICA consultant team visited Tunisia five times and stayed for two or three months each time. The study including activities in Tunisia and in Japan were divided into three phases. An outline of each phase is introduced below. Moreover, a bird's eye view of the Project is shown on the final page as a reference material.

[Phase 1: August ~ December 2006]

In Phase I, 83 Tunisian companies were visited in order to conduct a fact-finding survey of the quality and productivity improvement efforts of companies. Since the Tunisian Government had requested that the pilot project (PP) would target the two sectors of electrical & electronic and food processing, the survey focused on these two sectors. In specific terms, the fact-finding survey targeted 33 companies in the electrical & electronic sector, 30 companies in the food processing sector and 20 companies in other sectors. Based on the survey findings, a total of 29 PP target companies, that is 15 in the electrical & electronic sector and 14 in the food processing sector, were selected. Table I shows the products that are made by these companies.

[Table I] Pilot Project (PP) Target Companies and Major Products

Sector	Major Products of OPP Target Companies
Electrical & electronic sector (15 companies)	Domestic electrical appliances (2), wire harness and cable (2), current stabilizers (ballast) (3), solar water heaters (1), connectors (1), batteries (1), plug outlets (1), switches (1), circuit breakers (1), fluorescent lamps (1), others (1)
Food processing sector (14 companies)	Vegetable processing (4), olive oil (2), confectionery (2), beverages (1), dates (1), meat (1), fish processing (1), wine (1), food additives (1)

[Note] At the start of the PP, there were 15 target companies in the electrical & electronic sector and 14 in the food processing sector, however, the numbers had dropped to 14 and 13 respectively by the end of the PP.

[Phase 2: January ~ October , 2007]

Phase 2 was primarily the phase for pilot project (PP) implementation.

There are numerous technologies and techniques for quality/productivity improvement (hereinafter, technologies and techniques for quality/productivity improvement shall be referred to as “KAIZEN⁵⁾ techniques”), and the objective of the PP was to confirm which KAIZEN techniques are effective for what kinds of problems and how far Japanese thinking and approaches can apply to countries of differing social and cultural customs. In addition, the PP aimed to utilize these findings in formulating a master plan for the future improvement of quality/productivity in Tunisian industries covering all sectors.

In implementing the PP, a joint team comprising the JICA consultants, counterparts (C/Ps) and target companies were organized. Table II shows the composition of the teams organized in the electrical & electronic sector and the food processing sector.

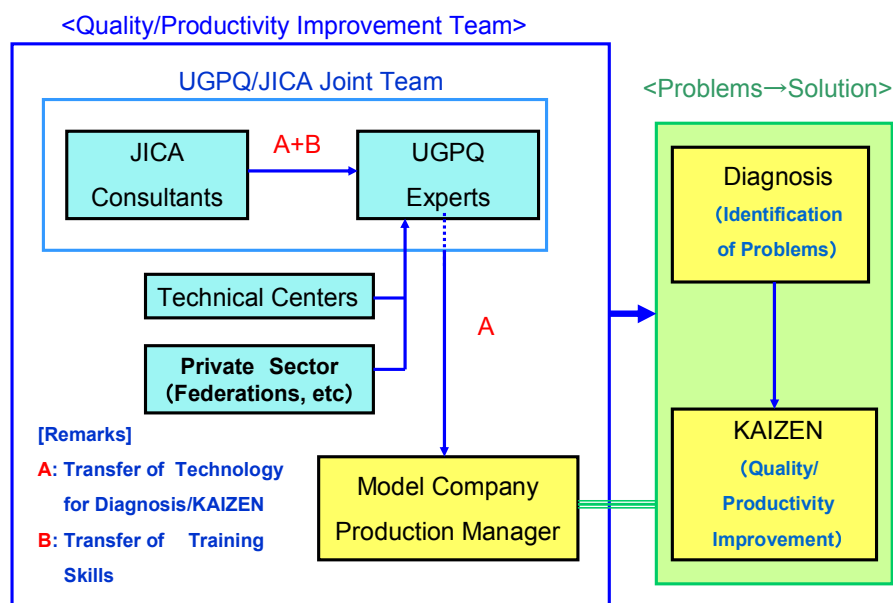
5) The Japanese word “KAIZEN” has come to be internationally used in the area of production management. In English, this is referred to as continuous improvement.

[Table II] Pilot Project Implementation Team

		Organized PP implementation teams		Number of team members from JICA, C/Ps, PP target companies
		Electrical & electronic sector team	Food processing sector team	
JICA consultant team	Team leader Member in charge of institution building Member in charge of work coordination	Electrical & electronic consultants : 2	Food processing consultants: 2	7
C/P team	UGPQ director Member in charge of institution building Member in charge of work coordination	Electrical & electronic technical staff: 5	Food processing technical staff: 5	13
PP target companies team	Top managers	Production managers / Quality controllers Employees in charge of production	Production managers / Quality controllers Employees in charge of production	Numbers varied depending on the company

In Phase 2, upon dividing the target companies into the electrical & electronic sector and the food processing sector, corporate diagnosis was implemented on each company, two or three problems in terms of quality/productivity improvement were identified in each company, and the JICA consultants, C/Ps and target companies (top managers, production managers or quality controllers) examined what kinds of KAIZEN techniques should be applied for resolving each issue. Based on this, a PP implementation plan was prepared for each PP company. Each plan was implemented based on the premise of using existing machinery and equipment, i.e. exploring how far quality/productivity improvement could be achieved without introducing new machinery and equipment. Figure A shows the overall view of the PP.

A Concept of Pilot Project for Quality/Productivity Improvement



During the PP, the JICA consultants and C/Ps visited each company on average seven times. Each time meetings were held to verify that the homework given in the previous meeting had been done, to check the state of progress of improvement activities, to exchange opinions, and to determine what should be done by each PP company by the next visit⁶⁾.

<Outputs of the Pilot Project>

Around nine months were spent to implement the PP. The following four items can be given as the main outputs of the PP which are lessons from the PP for successful implementation of the similar project.

- ① Improvements were seen in quality and productivity in more than half of the PP target companies.
- ② The quality and productivity awareness of PP company managers was reformed.
- ③ Basic technologies including Japanese KAIZEN techniques for quality/productivity improvement were transferred to the counterparts.
- ④ Guidance manuals concerning quality/productivity improvement were prepared.

Outline descriptions of these outputs are given below.

① **Improvements were seen in quality and productivity in more than half of the PP target companies.**

The PP was implemented over nine months from January to October 2007. More than half of the target companies experienced greater improvements than expected in the areas of quality/productivity.

During the PP period, the number of companies that were able to achieve numerically expressible quality/productivity improvement using existing machinery and equipment was 9 out of 14 companies (64%) in the electrical & electronic sector and 4 out of 13 (31%) in the food processing sector. For example, 8 companies achieved higher productivity of at least 20%, 3 of these raised productivity by at least 50%; another company cut its nonconformity rate from around 20% to 0%, while another company reduced die replacement times from 110 minutes to 70 minutes. Other companies were unable to produce numerically expressible results during the PP period, however, they have the potential to produce outputs in the near future, and even if they don't, they will at least be able to utilize the KAIZEN techniques acquired during the PP in their future corporate production activities (see Table III).

6) Rather than directly instructing solutions to the top management and line managers (production managers and quality controllers) of the PP companies, effort was made to give hints and the method of thinking for solutions. The PP company personnel were encouraged to discover problems for themselves and to strive for solutions on their own efforts because it was deemed that this would give the companies a better chance at sustainable development. A manager of one of the PP target companies said, "The project didn't give us fish but rather how to catch the fish," and this was the intent of the JICA consultant team.

[Table - III] Results of Quality/Productivity Improvement in the PP
(figures indicate the number of PP companies)

	A	B	C
Electrical & electronic sector	9	3	2
Food processing sector	4	3	6

[Information source] Compiled from the JICA Study on Master Plan for Quality/Productivity Improvement in the Republic of Tunisia (Final Report, July 2008), JICA homepage (<http://www.jica.go.jp/>)

[Note] Rank A indicates companies that achieved conspicuous outputs in terms of higher awareness of quality/productivity improvement among top managers and line managers, higher per capita productivity, shortened operation and travel times in the factories, reduced percent defective and so on. Rank C indicates companies where awareness of quality/productivity improvement among top managers and line managers was rather passive and conservative and where no particular progress was made in terms of quality/productivity improvement (although at least the KAIZEN techniques were transferred). Rank B indicates companies situated somewhere between these two extremes. Among the B-ranked companies, some companies realized increased productivity of 50% or more during the PP period, although the awareness of top managers regarding the importance of quality/productivity improvement remained rather weak. Such assessments were made by the JICA consultants and UGPQ/Technical Center staff, i.e. the C/Ps.

② The quality and productivity awareness of PP managers was reformed

At the start of the PP, the techniques used for improving quality and productivity were so basic that most of the top managers and line managers doubted whether such techniques could produce good outputs. However, as the PP advanced and outputs started appearing, their awareness regarding quality/productivity improvement changed and more managers approached the work vigorously. In the final analysis, the best results were achieved in the companies where the managers were the most enthusiastic about quality/productivity improvement. This outcome is indicated in Table IV(1) and Table IV(2).

[Table IV(1)] Electrical & electronic Sector: Relationship between Enthusiasm of Top Managers and Level of Improvement

	Improvement Level A	Improvement Level B	Improvement Level C
Level of top management enthusiasm a	6	1	
Level of top management enthusiasm b	3	2	1
Level of top management enthusiasm c			1

[Table IV(2)] Food Processing Sector: Relationship between Enthusiasm of Top Managers and Level of Improvement

	Improvement Level A	Improvement Level B	Improvement Level C
Level of top management enthusiasm a	2		
Level of top management enthusiasm b	2	3	3
Level of top management enthusiasm c			3

[Information source] Both tables above are compiled from the Study on Master Plan for Quality/Productivity Improvement in the Republic of Tunisia (Final Report, July 2008), JICA homepage.

[Note] The meanings of improvement levels A, B and C are the same as explained in the notes under Table III. Levels of top management enthusiasm a, b and c indicate the level of enthusiasm regarding quality/productivity improvement activities: "a" indicates very enthusiastic top management, "c" indicates rather passive and conservative top management, and "b" indicates top management somewhere between these two extremes.

③ **Basic technologies including Japanese KAIZEN techniques for quality/productivity improvement were transferred to the counterparts.**

During the PP implementation period, the JICA consultants transferred basic KAIZEN techniques including Japanese improvement techniques to the C/Ps and PP target companies via OJT on production lines in the PP target companies. Table V shows the types of KAIZEN techniques that were learned by the C/Ps and they can provide guidance on to production managers and quality controllers in Tunisian companies from now on⁷⁾.

[Table V] Types of Improvement (KAIZEN) Techniques that were Acquired in the PP and can be Autonomously Used by the C/Ps in Future

Nº	Improvement Technique	Contents of Improvement Technique
1.	Layout improvement	PQ analysis ⁸⁾ / Transfer distance analysis / Process proximity analysis
2.	Improvement of the work man-hours balance	Time research (stopwatch method) / Operation research
3.	Shortening of setup times	Single setup (SMED) method ⁹⁾ / Vide analysis
4.	QC circles ¹⁰⁾	Analysis using the 7 tools of QC ¹¹⁾ / 7 areas of waste elimination
5.	5S ¹²⁾	Tag method / Color display / Visual control / Dividing lines

[Information source] Compiled from the JICA Master Plan Study for Quality/Productivity Improvement in the Republic of Tunisia (Final Report, July 2008), JICA homepage

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- 7) The technologies and techniques transferred to the Tunisian side in this project were extremely basic, and there are numerous other techniques for improving quality and productivity. It is anticipated that further improvement techniques will be acquired during the next phase of technical cooperation.
- 8) PQ analysis is an analysis technique that entails drawing P-Q charts (with the types of products targeted in production P on the horizontal axis, and quantities Q on the vertical axis) and using them as the basis for layout planning.
- 9) SMED, which stands for Single Minutes Exchange of Die, is a method for eliminating wasted time in manufacturing processes.
- 10) QC circle (Quality Control Circle) refers to small groups of frontline workers organized with the goal of continuously managing and improving the quality of products, services and work. There are three basic principles of activity: ① exercising human ability and bringing forth unlimited potential, ② valuing human nature and creating cheerful workplaces where people feel rewarded by their work, and ③ contributing to improvement and development of the company's stature. (According to the Japan Industrial Management Association publication "Dictionary of Production Management Terms, Japanese Standards Association, 2005, 3rd edition (the first edition, 2002).
- 11) In QC activities, data are frequently collected and quality improvement issues are tackled based on the information obtained from them. The basic tools used to read various kinds of information from data are referred to as the "7 tools of QC" and constitute Pareto diagrams, check sheets, histograms, scatter diagrams, control drawings, graphs and cause and effect diagrams.
- 12) 5S is taken from the initial letters of the Japanese words Seiri (sorting), Seiton (systematic arrangement), Seiso (sweep), Seiketsu (scrub) and Shitsuke (self-discipline). Seiri (sorting) refers to sorting necessary items from unnecessary items and tidying up the items that aren't needed. Seiton (systematic arrangement) refers to preparing items in their set positions so that necessary items can be immediately used when they are needed. Seiso (sweep) refers to the removal of foreign materials from necessary items. Seiketsu (scrub) refers to the maintenance of a clean state through repeated implementation of sorting, arrangement and cleaning. And Shitsuke (self-discipline) refers to always conforming to the things that have been decided (according to the aforementioned publication of the Japan Industrial Management Association).

Since the C/Ps compiled the manual describing these KAIZEN techniques under guidance from the JICA consultants during the PP period, they were able to gain understanding of the improvement techniques from both the theoretical and practical viewpoints. In future, it is anticipated that the C/Ps will enlighten each other to further advance the improvement techniques in these five areas, and build up diagnostic and guidance experience in company production environments so that they can nurture young engineers in their own Technical Centers (CETIME, CTAA) as well as the other sector Technical Centers too.

The KAIZEN techniques indicated in Table V, i.e. layout improvement, improvement of the work man-hours balance, shortening of setup times (SMED), QC circles and 5S, have produced particularly good results in the electrical & electronic sector. Among these techniques, 5S is an effective technique in all companies across all sectors, and around half the targeted companies that applied it in the food processing sector experienced positive results. In Japan, the 5S is the most basic KAIZEN technique for quality/productivity improvement and has been disseminated to almost all sectors irrespective of major corporations or small and medium enterprises. The Toyota Production System established by Toyota Motor Corporation has generated outstanding results in terms of quality/productivity improvement, and the 5S occupies an important position within this too.

④ Guidance manuals concerning quality/productivity improvement were prepared.

Under guidance from the JICA consultants, the counterparts themselves compiled the improvement techniques they learned via OJT into manuals for guidance of quality/productivity improvement for electric & electronic sector and food processing sector in both English and French. On completion of the overall project in July this year, the manuals in Arabic were also finished. This will be utilized by the C/Ps when they conduct guidance of quality/productivity improvement to technical staff of the public Technical Centers as well as production line managers in Tunisian companies.

[Phase 3: November 2007 ~ July 2008]

In Phase 3, based on the results of the fact-finding survey of companies in Phase 1 and results of PP implementation in Phase 2, the master plan and action plan including institution building for disseminating the KAIZEN techniques were formulated. Within the master plan, the following four points were proposed.

- ① Strengthening of general quality capability
- ② Promotion of trainers' training
- ③ Reform of awareness of top management
- ④ Establishment of the dissemination setup (establishment of a core organization)

These recommendations are outlined in the following paragraphs.

① **Strengthening of general quality capability**

Quality has a number of aspects. The type of quality targeted in the project in Tunisia was “quality of manufacture¹³⁾.” In other words, it referred to the quality of products manufactured by processing materials and assembling parts. However, no matter how good assembly technology is, good products cannot be made if the quality of parts is poor. Also, customer satisfaction cannot be attained with poor designs. In order to make products of sufficient quality to prevail amidst international competition, it is necessary to improve “quality of manufacture,” “quality of parts” and “quality of design.” There is also the question of “quality of marketing.” Therefore, in order to make products that provide satisfaction to customers at home and abroad (the final users), it is necessary to approach quality improvement from a comprehensive viewpoint.

Particularly in Tunisia, since most parts and materials for manufacturing companies are imported from Europe, and these are processed and assembled into products for exporting back to Europe, the processes conducted in Tunisia have the lowest added value within the value chain. Accordingly, with a view to one day enabling Tunisia make its own parts and implement the higher value adding process of design, it was recommended that general quality capability be strengthened.

② **Promotion of trainers’ training**

In order to widely disseminate the KAIZEN techniques that were transferred in the PP not only to staff of the public Technical Centers but also the companies of Tunisia, since the absolute number of C/Ps in the PP is not enough, it is necessary to develop many more trainers. OJT on production lines is the most effective method for nurturing trainers, and recommendations were given on how to the C/Ps who received transfer of technology in the Project should develop trainers (mainly technical staff of the Technical Centers) and production line managers of Tunisian companies via OJT.

③ **Reform of awareness of top management**

In order to achieve quality/productivity improvement, it was confirmed in the PP that changing the awareness of top management is the most important point. So how can be managers encouraged to change their awareness? It was proposed that guidance be carried out via OJT on production lines and through effective training programs for managers.

④ **Establishment of the dissemination setup (establishment of a core organization)**

In order for Tunisia to improve its international competitiveness in future, quality/productivity improvement is one of the most important issues it must tackle. There is no core organization at present to widely disseminate KAIZEN techniques and know-how to

13)“Quality of manufacture” is also referred to as the actual quality or the quality of finished products and services that are manufactured or provided with a view to realizing the quality of design. “Quality of design” refers to the target quality aimed for in the manufacture and provision of products and services.

industries in Tunisia. It was proposed that the UGPQ under the Ministry of Industry, which was the direct counterpart agency in the Project, become the core agency and work with other related agencies in establishing a dissemination setup and realizing the above three recommendations (①~③).

2. Lessons from the Project in Tunisia: Conditions for Success

More than half of the PP companies could get the results more than expected, while some PP companies could not. What were the reasons behind those results? We could get the following lessons through the PP implementation.

- ① The best results were realized in those companies where top management and production line managers (production managers and quality controllers) jointly held high awareness regarding quality/productivity improvement and worked positively towards it. (Conversely, the companies where top management and production line managers held a passive attitude towards quality/productivity improvement did not achieve much improvement). The level of commitment of top management is especially important¹⁴⁾.
- ② The positive attitude of the C/P agencies (MIPME and UGPQ) and the C/Ps (technical staff of the public Technical Centers) toward the acquisition and dissemination of KAIZEN techniques contributed to the realization of the overall PP outputs.
- ③ It is indispensable for the consultants responsible for conducting the transfer of technology to have ample expert knowledge and guidance experience concerning quality/productivity improvement¹⁵⁾. (In the case of the project in Tunisia, the JICA consultants possessed experience of factory management in Japan and Asia as well as guidance of quality/productivity improvement in Asian companies).
- ④ It is essential to have teamwork among the three stakeholders (top management and production line managers of companies, the C/P agencies and C/Ps, and the consultants conducting the transfer of technology) who possess the common target of quality/productivity improvement. (In the case of the project in Tunisia, the PP companies where this teamwork functioned well were able to produce good improvement outputs, especially in electric and electronic sector).

14)Dr. W. Edwards Deming says, "Where is quality made ? Quality is made in the boardroom." (Rafael Aguayo, foreword by W.Edwards Deming, *Dr.Deming : The American Who Taught the Japanese About Quality*, Fireside, New York, 1990.)

15)When discussing transfer of technology, the ability of the receiving side to learn and absorb technology tends to be focused on, however, attention should also be paid to the specialist technical capability of the providing side too.

3. Japan's Experience: How has Japan Implemented Quality/Productivity Improvement?

Japanese industries were in a state of devastation at the end of WWII (around 60 years ago). It was urgently necessary to modernize machinery and equipment and to promote the innovation of production management. In spite of the extremely low level of manufacturing technology, the Japanese continued to make products. Labor costs were certainly low at this time, however, the quality of products was so poor that they were not fit for export. In overseas markets, Japanese products had the reputation of being cheap but of poor quality. For example, Japanese watches didn't keep time, shoes soon became ragged, and radios were prone to annoying noise. However, today Japanese products are internationally recognized for their high quality levels. During this period, Japan advanced research and development of its own unique KAIZEN techniques geared to improving levels of quality and productivity, and a number of these techniques have become internationally famous, for example, 5S, QC circles, the 7 tools of QC, visual control, the Toyota Production System and so on. The private sector was first to take the initiative in improving quality and productivity in Japan, then academics provided theoretical cooperation, while the government provided indirect and direct support in a three-way collaboration among industry, government and academia. Here, we will discuss the way in which Japan tackled improvement of quality and productivity in the post-war era.

3.1 Quality and Productivity Improvement Movement in Japan

① Quality Improvement Movement

Concerning quality control, large disparities between Japan and the United States were strongly recognized soon after the war, and Japanese industrial and academic circles displayed a strong interest in the advanced quality control techniques of America. The Union of Japanese Scientists and Engineers (JUSE¹⁶⁾ was established in 1946 in order to introduce and disseminate American scientific quality control techniques in Japan. JUSE first invited Dr. W. Edwards Deming from the United States of America, who proposed quality control based on statistical techniques, and received guidance from him in 1950. Industrial leaders jumped at these techniques, and records of his lectures became the first manual for spreading quality control in Japan. He had been invited to Japan every year since then¹⁷⁾. Dr. Deming donated the royalties from those records to a fund that was used in 1951 to establish within JUSE the Deming Prize for companies realizing outstanding success in the field of quality control. Although the Deming Prize was instigated by a private sector organization, it had honorary significance for Japanese companies and became the best possible advertising tool for selling high quality products on markets in both Japan and overseas. Winning this award became a major objective for many Japanese companies at this time, and it played an important role in raising the quality control level of Japanese companies.

16) <http://www.juse.or.jp/>

17) "Deming predicted that within five years Japan would be economically competitive and that consumers worldwide would clamor for Japanese goods. While many were skeptical, the presence of an American expert was compelling. In order not to lose face they faithfully followed his instructions. Within eighteen months of the first lecture the Japanese saw tremendous improvements in the quality of their goods and in productivity. They beat Deming's five-year timetable with a year to spare." (Rafael Aguayo, *Dr. Deming: The American Who Taught the Japanese About Quality*, Fireside, New York, 1991.)

Furthermore, since academics conducted research and investigation into quality improvement and the government supported the efforts of industry and academia, the movement towards quality improvement in Japan truly involved all elements of society.

In Japan, November is designated as Quality Month, and during this time symposiums on quality control, lecture meetings and various other events involving the public are staged throughout the country. The Deming Prize is also awarded in November¹⁸⁾.

Tunisia is now in the process of devoting nationwide resources towards creating a culture of quality.

Tunisian Government has established an award system for companies displaying excellent results in quality improvement, and the first ever “Quality Grand Prix” awards were presented to private sector companies in March 2008. A “Quality Week” has been established during March and during this time seminars and symposiums are staged and the Presidential Grand Prix awards ceremony is held.

② Productivity Improvement Movement

Concerning improvement of productivity, Japan was influenced by the productivity movement in Europe.

In the United Kingdom, based on the belief that elucidating the secret of America’s high productivity and applying it to British industry was the fastest way to post-war economic reconstruction, a productivity center was established and American management methods for raising productivity were introduced and disseminated. The United States gave strong support to these efforts in the UK. These activities spread to other European countries and the European productivity headquarters was established in 1951. The basic approach to improving productivity here entailed the simultaneous maintenance and expansion of productivity and employment based on harmonious labor relations, and it aimed to realize the fair distribution of outputs between top management, workers and consumers.

Inspired by such developments in the advanced countries of Europe and America, the momentum to advance productivity improvement gained pace in Japan too, and this culminated in the establishment of the Japan Productivity Center (JPC) comprising top managers, workers and academics in 1955. The JPC dispatched numerous missions to the United States to collect information and materials on American production management methods, and following the

18)The Japanese Deming Prize and Quality Month have influenced quality improvement activities in countries throughout the world. In the United States, starting with the establishment of the Malcolm Baldrige National Quality Award in 1987, October was designated as the Quality Month in the United States and Canada in 1988. During this month, quality improvement activities are implemented all over the country and these activities are recognized as having contributed to economic recovery. Moreover, on the second Thursday of November, which has been designated as World Quality Day at the suggestion of the United Nations, quality improvement activities are carried out all over the world. Concerning standardization too, World Standard Day was established to coincide with the standardization month of October in Japan in 1969, and standardization reinforcement activities are implemented throughout the world during this month (see <http://www.juse.or.jp/>)

dissemination of such information in report meetings and seminars after such missions returned home, it became common knowledge for many companies. At the start major corporations were primarily involved in such activities, however, small and medium enterprises also became involved later on. Based on harmonious labor relations, various modern types of equipment were introduced and American management systems were adopted. The objective here was to effectively and scientifically utilize resources, labor and equipment in order to reduce production costs, expand markets, boost employment and enhance real wages and the standard of living, and thereby to enhance common benefits for management, workers and general consumers. Since this coincided with the start of Japan's era of rapid economic growth, improvement of productivity signified the expansion of markets and production as well as growth of employment and introduction of modern equipment and facilities. In addition, disputes did not arise between labor and management.

The JPC was renamed as the Japan Productivity Center for Socio-Economic Development (JPC-SED¹⁹) in 1994 and was given the objective of approaching the productivity movement from a broader social and international perspective and forming national consensus for the reform of socioeconomic systems.

③ **Quality Improvement and Productivity Improvement: Higher quality leads to higher productivity (Dr. Deming)**

As was mentioned earlier, in Japan, nationwide movements for promoting quality improvement and productivity improvement have been advanced with the initiative played by the Union of Japanese Scientists and Engineers (JUSE) and the Japan Productivity Center (the current Japan Productivity Center for Socio-Economic Development or JPC-SED), respectively. In addition to these two organizations, various other private sector organizations and research institutes have worked on improving quality and productivity. Needless to say, many corporations have also developed their own unique systems as in the case of Toyota Motor Corporation which developed the Toyota Production System(TPS) including JIT(Just-in-Time).

What is the difference between quality improvement and productivity improvement, and how are the two related? Detailed explanation will not be given here, however, what is clear is that when quality improvement is advanced productivity improvement follows²⁰, and vice versa. In reality, the Union of Japanese Scientists and Engineers (JUSE), which has promoted quality improvement, has various training programs and has also worked on KAIZEN techniques for quality improvement as well as productivity improvement, while the Japan Productivity Center has established the Japan Quality Awards system and encourages quality improvement in corporate management. In recent times, many areas of the two organizations' activities have come to overlap. Even when quality improvement and productivity improvement are advanced separately, the end results eventually approximate and overlap with each other.

19)<http://www.jpc-sed.or.jp/>

20)Dr.W.Edwards Deming maintained that if quality improves, rework will be reduced, mistakes will be lessened, there will be less delays, nonconformities and wasteful use of machines and materials, and as a result costs will be reduced and productivity will be improved (Mary Walton, The Deming Management Method, Management Books 2000 Ltd., 2000 (first ed., 1994)

3.2 Cooperation among Industrial Sector, Academia and Government

As has been described above, in Japan, in both quality and productivity improvement, first the industrial sector played the central role in instigating the movement, academic circles offered support for the survey and research field, and the government backed up struggling areas in the industrial sector. Such work should really primarily be performed by the industrial sector, however, the feature of Japan's experience is that industrial sector, academia and government collaborated on improving both quality and productivity. (In Tunisia's case, the government has taken the initiative and is striving to deploy the quality/productivity improvement movement throughout the nation while collaborating with industry and academia.)

3.3 Policies and Measures for the Promotion of Industrial Technology:

Since Japan was not blessed with natural resources, it had to rely on so-called processing trade, whereby resources and raw materials were imported from abroad, processed and exported, in the post-war years. For this reason, policies and measures were adopted with a view to raising the overall level of industrial technology including processing technology. In addition to the aforementioned promotion of quality/productivity improvement, the following policies and measures were taken.

(1) Introduction of the diagnosis and guidance system:

System for introducing management diagnosis to small and medium enterprises, conducting management improvement based on the obtained results, and offering technical guidance as well as advice and guidance on the modernization of machines and equipment. Under this system, small and medium business owners in regional areas were able to receive diagnosis, advice and guidance services concerning management and technology from advisors belonging to local governments.

(2) Establishment of public test and research agencies:

Public test and research agencies on the national and local government levels were established all over the country, and test and research activities were conducted according to local industrial needs. Moreover, such agencies could respond not only to the everyday technical inquiries of local companies, but they could also work on resolving the technical problems faced by local industries. In recent times, public test and research agencies are advancing research and development geared to promoting local industries in new fields in collaboration with local universities.

(3) Enactment of the Export Inspection Law:

In the years immediately following the war, Japanese products were subject to endless complaints from overseas markets for being bad quality or imitations of western products. In order to deal with this, the Japanese government enacted the Export Control Law and introduced the exports quality inspection system. This led on to enactment of the Export Inspection Law making it necessary to inspect the quality of all products before export. Thanks to this system, all poor quality products were driven out and complaints regarding the quality of Japanese products were stemmed.

(4) Establishment of the Industrial Standardization Law:

In authorizing the JIS (Japanese Industrial Standards) mark, rather than simply reviewing the specifications of products, inspections came to be carried out on the state of quality control and machines & equipment in production plants and review targeted whether or not the plants satisfied the applicable standards. In particular, for small and medium enterprises, since products carrying the JIS mark were seen to have quality recognized by the state, this became a major advantage when selling to consumers and a lot of interest was paid to acquiring the JIS mark.

(5) Enactment of the Machine Promotion Law:

In post-war Japan, based on the view that promotion of the machine, electrical & electronic industries was important in terms of industrial strategy, first legislation was established, and then industrial sectors were designated with a view to widely promoting parts industries. As a result, modernization of supporting industries constituting the base of Japan's machine, electrical & electronic industries was advanced and this proved extremely effective in improving the standard of technology.

(6) Enactment of the Basic Technology Promotion Law:

Leaving aside the machine, electrical & electronic industries, in other industrial sectors too, so long as machines and equipment are used, it is essential to manufacture and supply the parts that constitute them. Moreover, since high quality parts tend to be demanded in order to realize differentiation, it is necessary to promote and evolve the base technologies that go into making such parts. Against such a background, legislation was established with the objective of developing the basic technologies of casting, pressing, dies, welding and machining, etc.

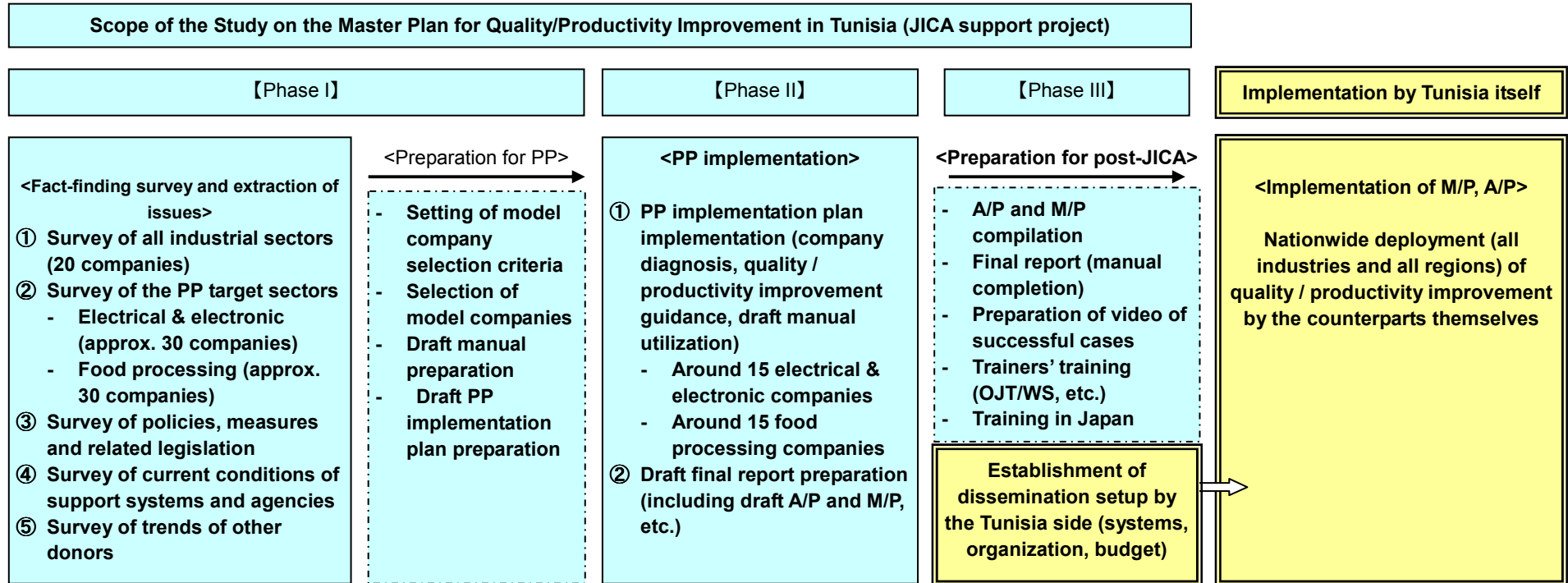
Summing up, it can be seen that government policies and measures had beneficial impacts both directly and indirectly on quality/productivity improvement and helped boost the international competitiveness of Japanese industries in the postwar years.

Conclusion

Today I have given a brief introduction to the project for quality/productivity improvement in Tunisia, Japan's postwar approach to improving quality and productivity including policies and measures for the promotion of industrial technology. I hope that these experiences will offer some useful information for quality/productivity improvement in Ethiopia too.

In closing, I would like to once again offer my thanks to the Ethiopian Government, the Japanese Embassy and JICA for giving me this opportunity to speak. Thank you very much.

[Reference Materials] Overall View of the Study on the Master Plan for Quality/Productivity Improvement in Tunisia



[Note] PP: Pilot Project, M/P Master Plan, A/P Action Plan, OJT: On-the-Job Training, WS: Workshop

This figure was prepared at the start of the project (July 2006). Accordingly, the numbers of companies in each PP target sector and companies targeted in the PP are the original numbers.

Blue areas mean components (activities) assisted by JICA, and yellow areas mean future actions to be taken by Tunisian Government side.