IV…Monitoring and Evaluation (M&E) for 5S-KAIZEN-TQM approach

IV-1…M&E is the basis of managing your business

Monitoring is a process to assess the advancement and constraints of work process. It should be conducted in a regular manner with standardization. Various check lists can be utilized for this purpose. The information obtained from the monitoring is provided to the decision-making of process amendment and/or adjustment of the resource input for the smooth implementation of the work.

Evaluation is, generally, an activity to review the entire process of the work for extracting lessons learnt both on positive and negative outcomes. The outcomes are thereafter analyzed to formulate better plan of action in the forthcoming phase of the work. In the context of hospital management, in general, quarterly review of the management targets, such as productivity, quality of service, cost control, delivery of services, safety issues and morale of the workforce, is considered as the evaluation activities.

A hospital functions as a complex of diversified services ranging from backyard services, logistics and front-line services, where health staff directly contact with patients and the caretakers. As repeatedly touched upon in this textbook, work environment improvement (by 5S) and KAIZEN practices should be routinely conducted at all work units in backyard, logistics / central services and the clinical front-lines. Standardization both of 5S and KAIZEN activities should be realized after proper training of the middle managers and the work unit members.

This situation allows the top management to communicate directly and/or indirectly to the workforce through the work environment improvement and problem-solving processes, which are maintained by each WIT. Of course the role of QIT will be extremely important to systematize the information collection particularly of S4 (Standardization) and S5 (Sustain) first in order to grasp the capacity and willingness of each WIT to detect and solve the problems, on which the workforce was suffered. Also KAIZEN process should be well learnt by WIT leaders first and thereafter by the entire workforce. Team work is then further enhanced based on the team's experience on 5S toward the implementation of problems-solving using the standardized KAIZEN process preceded by KAIZEN suggestions. The above is a quick review of so-called "Transitional phase from 5S to KAIZEN".

Now, what is the implication of "monitoring" in the above-mentioned context of 5S-KAIZEN processes, through which a hospital challenges to achieve TQM? The monitoring activities are actually the extremely important process both for the top and middle managers of a hospital. Monitoring is a mandatory task for all managers. If the managers are not properly conducting the monitoring on the work being done by the workforce, no one can call him or her a competent manager with leadership. Top management of an organization should always pay attention to outcomes produced by 5S and KAIZEN activities and interlink them with his or her management targets. This can only be a measure for rationalizing resource control with prioritization in investment. For this purpose, each step of 5S and KAIZEN should be carefully monitored through the function of QIT. Top managements' wise and logical decision-makings can be done only with full function of QIT, which supervise and energize all WITs, the actors of 5S and KAIZEN.

IV-2…Basic model

Traditionally, there are two approaches to evaluate health system program; one is Donabedian evaluation model and the other one is Project evaluation model.

Donabedian evaluation model consists to "Structure", "Process" and "Outcome". In terms of the evaluation of 5S- KAIZEN- TQM approaches, Structure is mainly improved by 5S, Process is mainly improved by KAIZEN and improvement of Outcome means proper TQM implementation.
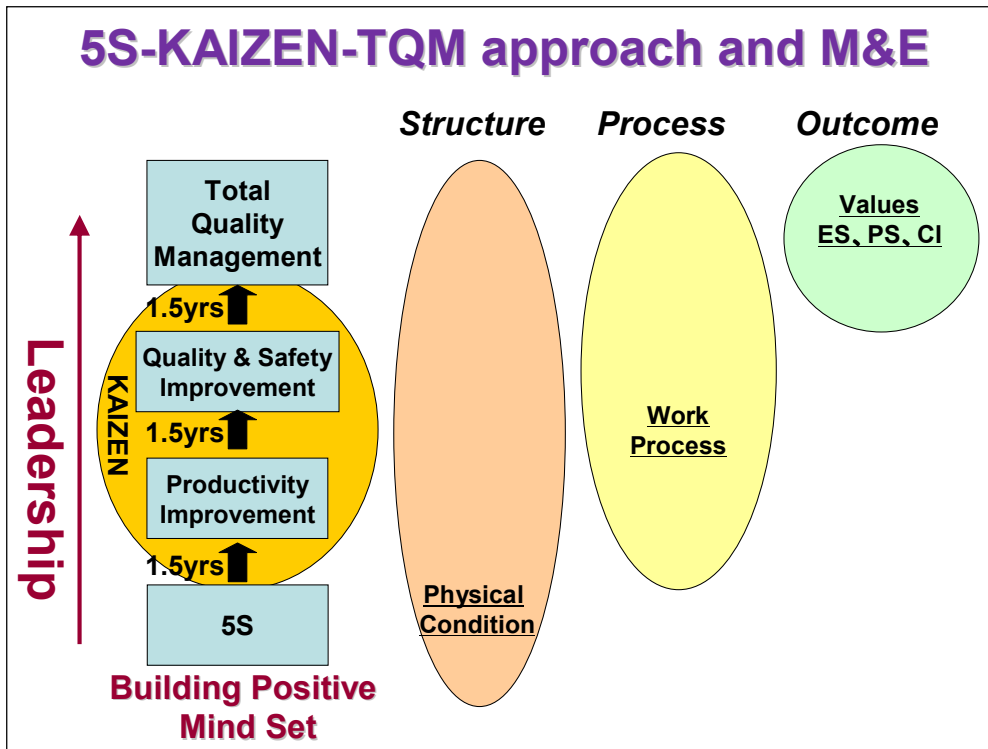
Figure 4-1: 5S-KAIZEN-TQM approach and M&E

Project evaluation model consists to "Target", "Objective" and "Goal" in the logically designated plan. One of the most common planning frames is called "Logical framework". There is "means and end" relationship among them. In terms of the evaluation of 5S- KAIZEN- TQM approaches, Project Purpose is same as purpose of 5S, KAIZEN and TQM, Target is same as target area of 5S, KAIZEN and TQM activities and Overall Goal means system of continuous 5S, KAIZEN and TQM activities.
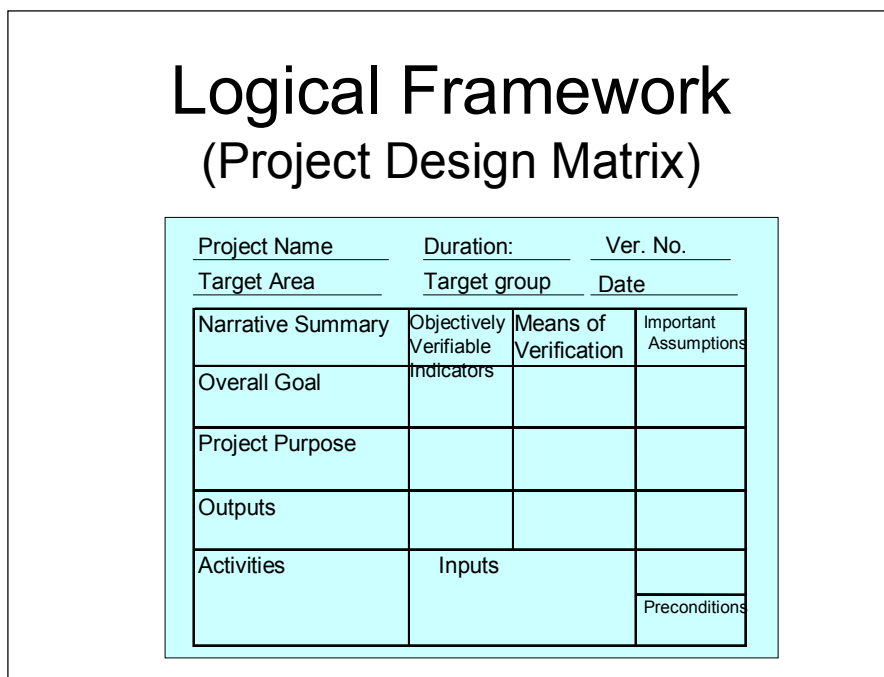

Figure 4-2: Logical Framework (Project Design Matrix)

IV-3…Evaluation Framework

Evaluation is assessing and judging the value of work of an organization. Its main purpose is to help an organization reflect on what it is trying to achieve, how far it is succeeding and identifying the required gaps. Generally, there are two dimension of the evaluation, formative and summative.

Table 4-1: Two evaluations

	Formative	**Summative**
Objective	Reflect process Help Improvement	Check Achievement Probe Impact
Evaluator	Self or Advisor	Third party
Method	Can be qualitative	Preferably quantitative objective
Baseline	Baseline data Necessary	Baseline data essential

Formative evaluation is a process of ongoing feedback on performance.   The purposes are to identify aspects of performance that need to improve and to offer corrective suggestions. Summative evaluation is a process of identifying larger patterns and trends in performance and judging these summary statements against criteria to obtain performance ratings.

IV-4…Objectives of monitoring and evaluation for 5S-KAIZEN-TQM approach

As mentioned above, the objective of the monitoring and evaluation is to minimize the gap between desired and actual status of the progress and / or performance of the project. For the health sector, the monitoring findings mainly describe the relevance of the process for service provision and the evaluation findings prove a real impact for ensuring the quality and safety for the hospital.

The evaluation on the program of Quality Improvement of Health Services by 5S-KAIZEN-TQM is to be viewed in the following three aspects:

To evaluate the progress of 5S-KAIZEN-TQM in hospitals
Firstly, it should be identified that the unique feature of the 5S accomplishment in the workplace of the hospital is to make initiation of the KAIZEN process.
Secondary, it should be evaluated that the improvement of the output, such as productivity, quality, cost control, safety, service delivery and morale of the staff, is accomplished though KAIZEN activities.
Finally, it should be reviewed the improvement of the outcome, such as clinical performance, employee satisfaction, patient satisfaction and the contribution for National Health Plan, is monitored toward the center of excellence with TQM.

To disseminate 5S-KAIZEN-TQM policy through the regulatory authority of that country
Monitoring and evaluation performances of the implementing authority especially Ministry of Health and pilot hospitals are mandatory for accommodating the relevance, efficiency and effectiveness of 5S-KAIZEN-TQM approach. The evaluation findings should be a policy input for the Ministry of Health for adopting right policy direction through strategic plan and guidelines and budget allocation for implementing the quality improvement of Health Services through 5S-KAIZEN-TQM.

To organize supporting system of 5S-KAIZEN-TQM at hospitals
Supporting system should be the part of evaluation. To encourage the activities in the field not to criticize /discourage their ongoing activities and to input necessary knowledge and skills are the most important roles of the supporting body. Mapping out whole supporting system and what is the function of each and how often what they do act and what expect to do. Supporting

structure-instruction, information delivery of the field should be provided in right way and better to chalk out the time table/schedule of the whole supporting system.

IV-5…Target of Monitoring and evaluation for 5S-KAIZEN-TQM approach

(1) 5S
The target of 5S is Work Environment Improvement (WEI). Taking photo before the implementation and after the implementation is basis for the monitoring and evaluation. Since it is mainly physical improvement, changing better situation is easy to identify visually. The implementation of minimum requirement in 5S is confirmed by check sheets at first, and the performance or output by 5S is also confirmed by check sheet and the other indicators if possible.

(2) KAIZEN
The target of KAIZEN is Output of the hospital though changing working process by KAIZEN, such as Productivity, Quality, Safety, Cost control, service Delivery and Morale of the staff. Also the KAIZEN process should be confirmed to clarify relationship between the improvement of Output and KAIZEN activities, such as WIT performance and empowerment of the staff.

(3) TQM
The target of TQM is Outcome by the hospital such as Clinical Indicators, Employee satisfaction and Patient satisfaction. If the hospital has the other tasks such as research, education and policy deployment, there is also the target of TQM.

IV-6…Feedback

The result of a process activity, output or outcome as evaluative response should be shared among the stakeholders. Periodical Meetings and 5S festivals are good opportunity to share the result and drawing the results on the graphs and tables and posting on the notice boards are effective. The contents of the results consist not only the data and negative sounds but also good practice, recommendation and lessons learned.

The monitoring and evaluation should be navigators toward further improvement by 5S-KAIZEN-TQM approach.

IV-7…Interaction between 5S-KAIZEN-TQM implementation and M&E

The figure 4-3 shows the phases of 5S-CQI (KAIZEN)-TQM implementation and how the M & E comes in. There are two things depicted here, which need to sit at the back of the mind of health workers; firstly, M & E is a continuous process; and secondly, 5S activities are never onetime implementation, they should be done on daily basis.
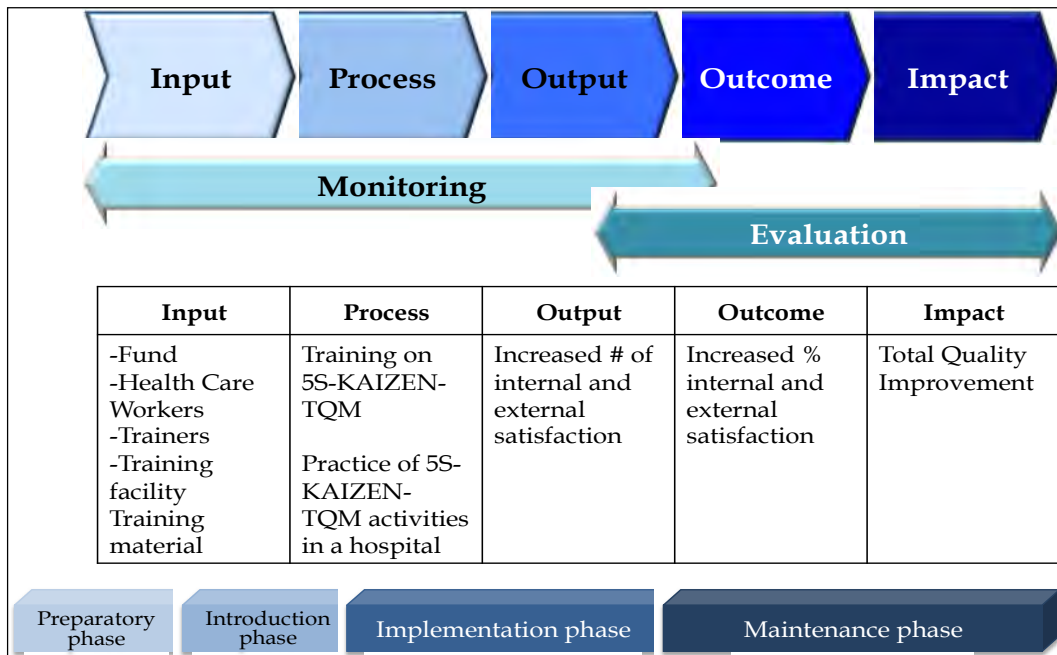
Figure 4-3: Interaction between 5S-KAIZEN-TQM and M&E

Most important input for 5S-KAIZEN-TQM activities is health workers that practice 5S-KAIZEN-TQM activities. 5S starts from training and education of health workers. Thus, trainers and teaching materials are considered as input.

After "Input" resources are there, it is necessary to train health workers. Then, practice 5S-KAIZEN-TQM activities in health facility. Due to the practice of 5S-KAIZEN-TQM activities, we expect the improvement of working environment and quality of services. Therefore, our expect output are increase the level of internal and external satisfaction through 5S-KAIZEN-TQM activities. Then continuation of the activities will make the satisfaction of both internal and external clients higher, and finally possible to establish total quality managed health facility as the impact of 5S-KAIZEN-TQM activities. To achieve this set goal, regular monitoring, mentoring and recognition of health workers, and evaluation of 5S-KAIZEN-TQM activities is essential.

IV-8…Monitoring and Evaluation of 5S-KAIZEN-TQM approaches

In the actual setting in developing countries, different levels of monitoring and evaluation activities could be conducted to ensure implementation of 5S-KAIZEN-TQM activities. Those levels are;

(1) National and local government level
External monitoring and evaluation of 5S-KAIZEN-TQM activities to health facilities are conduct at this level.

(2) Health facility management level
Internal monitoring and evaluation of 5S-KAIZEN-TQM activities to departments/sections /Units are conduct at this level.

(3) Health facility section/unit level
Daily monitoring and periodical self-evaluation of 5S-KAIZEN-TQM activities are carried out at this level

As mentioned before, it is very important to consider integration of existing health systems and M&E mechanism.

For example, United Republic of Tanzania introduced 5S-KAIZEN-TQM approaches into public hospitals at national, regional and district level. Currently, Ministry of Health and Social Welfare is conducting all external evaluation of 5S-KAIZEN-TQM activities, so called "Consultation visit". However, number of hospitals implementing 5S-KAIZEN-TQM activities, increases, it is difficult to manage all "Consultation visit". Therefore, it is trying to match with existing supportive supervision mechanism and "Consultation visit" at regional level, so that Regional Health Management Team (RHMT) can conduct "Consultation visit" to their own Regional Referral Hospital. Integration of M&E mechanism will improve sustainability, reduce costs and minimize other resources for M&E of 5S-KAIZEN-TQM activities.
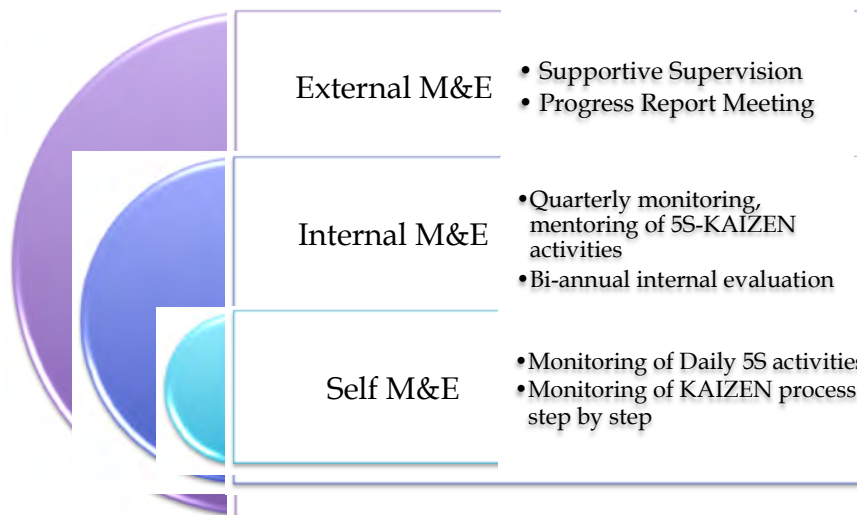

Figure 4-4: Different levels of M&E activities for 5S-KAIZEN-TQM

Therefore, it is very important to study about exiting M&E mechanism, and consider integration or harmonization of those M&E activities, tools and indicators with M&E activities of 5S-KAIZEN-TQM approaches.

External monitoring and evaluation
Ministry of Health or local government health authority is the responsible of external M&E activities. At the beginning of national rollout of 5S-KAIZEN-TQM approaches, Ministry of Health needs to organize and conduct external M&E activities to the health facilities. However, after rollout of the approaches, local government health authority needs to take over the M&E activities under the decentralization movement.

As an example, Tanzania Ministry of Health and Social Welfare, Department of Health Quality Assurance (MoHSW-DHQA) organizes "Consultation visits" to provide technical support and evaluate 5S-KAIZEN-TQM activities every 6 months. However, number of 5S implementing hospitals is increasing and difficult to monitor and evaluate 5S activities in many hospitals. Therefore, MoHSW-DHQA started to involve Regional Health Management Team (RHMT) and planning to hand over M&E activities for 5S-KAIZEN-TQM to regional level.

Another activity is called "Progress Report Meeting". The meeting to receive reports on progress of 5S-KAIZEN approaches implementation every 6 months. All 5S-KAIZEN implementing hospitals are invited to present their progress of activities. In the past, power point presentation, lectures, discussion and practice methodologies were used for training and rolling out of the approach.

These kinds of M&E activities are very important to organize and continue by Ministry of Health or local government health authority until 5S-KAIZEN-TQM activities become a culture of hospitals. Unfortunately, many public health facilities and staff working in the facilities used to get "order" from

higher authority or top management. However, 5S-KAIZEN-TQM approaches need to develop two-way communication from "top to bottom", and "bottom to top" This two-way communication improves openness in the facility and possible to see and hear what is happening on the ground.

Internal Monitoring and Evaluation by Quality Improvement Team (QIT)

QIT has responsibility of conducting monitoring and evaluation of 5S-KAIZEN-TQM activities within health facility. QIT monitor and evaluate their own performance and visit sections/departments periodically that are practicing 5S-KAIZEN-TQM activities. Visit sections/departments and provide technical advices, through coaching and mentoring, to Work Improvement Teams (WITs) are very important to know the progress of 5S-KAIZEN-TQM activities and find problem(s). During the monitoring of 5S-KAIZEN-TQM activities at section or department level, QIT needs to observe the following issues;

- Performance of WITs
  - -Leadership,
  - -Composition of WIT,
  - -Record keeping (pictures, minutes of meeting etc.)
  - -Training of staff
  - -Way of communication (reporting, regular meeting etc.)
- Progress of Sort, Set, Shine, Standardize and Sustain activities
- Progress of KAIZEN Process, if any KAIZEN approach is practiced
- Staff attitude

Points and areas to evaluate 5S-KAIZEN-TQM activities are same as monitoring. However, it is important to use evaluation sheet with proper evaluation scale (see VIII-1, VIII-2: 5S-KAIZEN M&E sheet)

Self-monitoring by Work Improvement Team (WIT)

Work Improvement Team (WIT) has responsibility to monitor day-to-day 5S and KAIZEN activities practiced within their work place. Progress of 5S and process of KAIZEN activities must be documented and share the results within the department/sections. The WIT will also communicate the results to QIT; and WIT should develop their own checklist for 5S-KAIZEN activities.

IV-9…Tools used for monitoring and evaluation of 5S-KAIZEN-TQM

To ensure effective implementation of the 5S-KAIZEN-TQM approaches, useful tools were developed and tested in many countries. The tools are as follows:

- Digital camera
- 5S-KAIZEN-TQM Monitoring and Evaluation sheet (VIII-1, VIII-2)
- 5S-KAIZEN-TQM Monitoring and Evaluation calculator
- KAIZEN Process Checklist (VIII-3)
- 5S Activity Good Practice Sheet (Figure 4-7)
- QIT interview sheet (VIII-4);

In addition, implementation plan develop in KAIZEN Process Step 5, Standardization plan develop in KAIZEN Process Step 7 are also important for monitoring of KAIZEN activities.

M&E tools can be developed only for 5S-KAIZEN-TQM activities. However, it is important to check other existing M&E tools that used in another program or regular supportive supervision in health sector. Look at possibility of integration of 5S-KAIZEN-TQM components into those tools to improve sustainability of M&E activities for 5S-KAIZEN-TQM.

IV-10…Visualization of M&E results and Record keeping

After completion of M&E activities, it is better visualize M&E results for easy understand and sharing results within your health facility or sharing with others. There are many ways to visualize M&E results such as photo taking, graphs, charts etc.

As mentioned in the above, photo taking (pictorial records) are good example of visualization. Photo taking is very good visualization for 5S activities. Pictures of before 5S, during the process, and after 5S need to be recorded. It is very powerful evidence of changes and improvement of working environment in health facility.

Before 5S   After 5S

Before 5S   Process   After 5S

Figure 4-5: Samples of pictorial record

Another good example of visualization is Radar chart created from 5S-KAIZEN M&E sheet. This radar chart with comparison of previous evaluation helps QIT and external evaluators to understand improvement or fall back of 5S-KAIZEN-TQM activities.

Dermatology

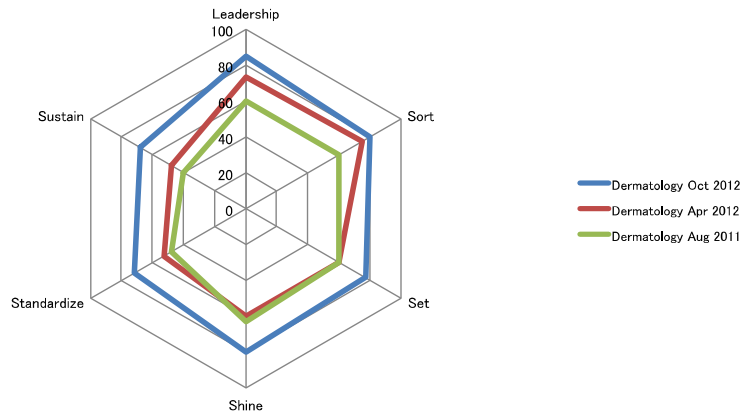|	Leadership	Sort	Set	Shine	Standardize	Sustain
Dermatology Oct 2012	85	80	77	80	72	68
Dermatology Apr 2012	73	75	60	60	53	48
Dermatology Aug 2011	60	60	60	63	48	40

Figure 4-6: Sample of radar chart with comparison

Similar to pictorial record, "Good Practice Sheet" is useful for both pictorial and 5S activity record keeping. The sheet contain information on where and who practiced, what was the problems and how the problems was solved with what type of inputs were used with pictures of before and after 5S activities.

Good Practice Registration Sheet

Date	15/05/2011	Name Of WIT	Volunteer	Team Leader	Hisahiro Ishizima
Content of Activity		Development the investigation trolley		**Team Member**	Noriko Komatu
Target Process		S1 to S3 activity			Youichi Toriumi
Target Product		Standardized investigation trolley, Checklist, Labels			Chiaki Yamanaka
					Noriyuki Miyamoto

Picture of previous condition	Picture of current condition improved by 5S

Description of previous condition	Description of current condition improved by 5S
We cannot get some items whenever we need those immediately. And we couldn't keep cleanliness. - Some items were mixed regardless of purpose of this trolley. - No cleanliness	We can get needed items for collecting blood specimen and reduce time of collecting some necessary items. Furthermore, we can keep enough amounts of all items by daily checking. - All items are put according to correct working process and labeling is already done. - Trolley is kept cleanliness. - Checklist is put next to the trolley.

Impact of 5S	Learning by implementing this idea
- We can reduce waste time of finding necessaries. - We can reduce waste action of finding necessaries. - Checklist is so useful 5S tool to keep necessaries. - Labeling is useful 5S tool to arrange each correct position. - We are able to work with a good feeling every day.	We didn't believe that 5S can reduce time and waste action before, but we can realize that now. Those are some of 5S benefit. And, if we standardize our work, we can work easily and offer our services immediately.

Figure 4-7: Sample of good practice sheet

Quality Improvement Team is the responsible unit to keep all M&E records with proper arrangement of information. Proper record keeping is very important to avoid repetition or rework which leads to reduce workload of QIT.

Figure 4-2: Level of M&E activities

Type	Implementer	Frequency	M&E activities	M&E through	M&E Tool
External M&E	Ministry of Health Local Health Authority	Bi-annual	Monitoring, Mentoring, Evaluation	Supportive Supervision Progress Report Meeting	Standardized M&E sheet Digital camera
Internal M&E	Quality Improvement Team	Bi-annual or Quarterly	Monitoring, Mentoring, Evaluation	Visiting sections and departments QIT-WIT meeting	Standardized M&E sheet Digital camera
Self M&E	Work Improvement Team	Daily	Monitoring	Observation and WIT meeting	Internal Checklist Activity plan

IV-11…Other tools for Monitoring and Evaluation

Monitoring and Evaluation are opportunities for 5S or KAIZEN activities to examine how well it is implementing its activities towards results and to formulate lessons learned. Our broad goal should be defined which reflects overall aim of the evaluation. There are many methods for evaluation. According to for 5S-KAIZEN-TQM approach, we also recommend three methods for monitoring and evaluating with the qualitative point of view; Time survey, Employee satisfaction survey and Patient satisfaction survey.

(1) Time survey
Through 5S –KAIZEN- TQM activities, there is a lot of improvements in the hospital. However, some improvements are invisible and hard to confirm the achievement in the routine works in the hospital.

The time survey is good tool to describe the process improvement easily and simple tool to measure the working process by the hospital staff. The hospital staff also is able to identity whether her / his work is efficient or not.

We hope the hospital to implement the time survey periodically to make sure the level of improvement of your hospital and to benchmark the performance of the improvement to the other hospitals. The examples are shown as following occasions.

Time survey for "Waiting time"
i) Reception
The receptionist gives a patient who just arrived at the reception the paper which was written the arrival time. The paper will received to hospital staff at the consultation room when the patient will come to the consultation room. The hospital staff writes the time of collection on the paper and calculates how much time was spent from arriving to the hospital to taking consultation.

ii) Laboratory test
At the consultation room, laboratory test request paper is issued with the issuing time. The laboratory technologist writes the time of issuing the result of laboratory test on the paper and gives the patient the result paper with request paper.
The request paper and result paper are collected at consultation room when the patient come again to the consultation room and the hospital staff calculates how much time was spent from test request to receiving the test result and consultation again.

iii) Payment
The account staff gives a patient who just arrived at the accounting section to pay money the paper which was written the arrival time. The paper will be collected to hospital staff when the patient will pay money. The hospital staff writes the time of collection on the paper and calculates how much time was spent from arriving to the accounting section to paying money.

2)   Time survey for "Work hours"
i)   Patient record
The surveyor measures the time by stop watch from ordering to the patient record room   to taking the proper patient record. (Try more than ten times and calculate average time)

ii)   Pharmacy
The surveyor measures the time by stop watch from ordering to the pharmacy to taking the proper medicines. (Try more than ten times and calculate average time)

iii)   Central Sterilize and Supply Department (CSSD)
After the sterilization, the surveyor measures the time by stop watch from starting packing the operation tools to completion of the packing. (Try more than ten times and calculate average time)

iv)   Linen supply
The surveyor asks to the line staff to drawing bar-chats regarding the process and times of line supply such as collection of dirty linen, laundry, iron, setting on the shelves.

(2) Employee satisfaction survey
Initial target of 5S-KAZIEN-TQM approach is to change the mindset of the employees through providing the appropriate environment for professional works of medical and non-medical staff. The most useful indicator to justify the changing mind set is degree of the satisfaction of the employees in terms of non-monetary incentives. The employ satisfaction survey deals with workplace issues, such as benefit, commitment to work, amenity, conformability, effective communication and so on. And the survey helps paint a portrait of their attitudes, complain and suggestions.

There are several types of template of employee satisfaction survey (also called job satisfaction survey). You can choose suitable one for your occasion or develop yourself based on the templates if you need not issues the result in academic fields as the evidence of the effectiveness of 5S-KAIZEN-TQM approach.

(3) Patient satisfaction survey
The overall goal of 5S-KAIZEN TQM approach is to deliver necessary medical services timely with adequate cost as well as the aim of the hospital. To justify the performance toward the aim of the hospital objectively, the degree of appropriateness of the services might be evaluate by customers. One of the most important customers for the hospital is the patient because the hospital was established for patients. The patient satisfaction survey also gives us the opportunity to know honest patients' feeling and to improve the hospital more and more if the survey has been implemented properly and fed back to the QIT and WIT promptly.

There are also several types of template of patient satisfaction survey (also called customer satisfaction survey). You can also choose suitable one for your occasion or develop yourself based on the templates if you need not issues the result in academic fields as the evidence of the effectiveness of 5S-KAIZEN-TQM approach.

IV-12…Recognition and Competition

To establish sustainable mechanism for implementation of 5S-KAIZEN-TQM activities in health facility, it is important to use two schemes of "Recognition" and "Competition"

"Recognition" and "Competition" are often confused among people. These schemes are two different things. "Recognition" is a process to recognize achievement of implementers for certain level of performance towards to set standards or target. However, "Competition" is to compete level of performance among implementers, and rank them based on their performance. Usually, "Recognition" comes with certificate or recognition letter given to implementers when set standards or target achieved. On the other and "Competition" comes with prize such as trophies, medals or plaque.

Aims of introducing "Recognition" scheme into health facility are;
    To increase; motivation of health workers to continue good practices,
    To increase productivity and safety,
    To improve dialogue between management and health workers,
    To reactivate professionalism, strengthen teamwork.

On the other hand, aims of introducing "Competition" scheme into health facility are;
    To energizing health workers,
    To increase performance,
    To enhancing creativity to come up with innovative ideas,
    To cultivate ownership and leadership and so on.

Note that people often confuse recognition scheme with accreditation scheme. It is very important to differentiate recognition scheme from accreditation scheme as recognition scheme has meaning of appreciation on efforts made by implementers and recognized their performances. On the other hand, accreditation scheme is evaluate set standards of quality, and if those standards are not achieved, health facility could be punished.

Introduction at Health Facility Levels
Based on the experiences from different health facility, it is recommended to introduce "Recognition" scheme first for effective and efficient rollout 5S activities. "Recognition" scheme needs to have clear criteria to recognize achievement of implementers. The criteria for the scheme must be shared with all staff working in health facility.

The table below is the example of "Recognition" stage and its criteria. QIT should develop such table and share with all sections and departments.

Table 4-3: Sample of Criteria for Recognition scheme

Recognition stage	Recognition Criteria	
Stage 1	WIT established and has OJT mechanism in the section. All WIT member has basic knowledge and skills on 5S	Certificates
Stage 2	Sorting, Setting, and Shining activities continuously conduct	Certificates
Stage 3	Standardization and Sustainable measures for 5S activities practiced	Certificates and announcement
Stage 4	All WIT member has basic knowledge and skills on KAIZEN Small KAIZEN is practiced	Certificates
Stage 5	KAIZEN Process is used for solving problems in the section	Certificates and announcement

When the KAIZEN processes are known and used by health workers, introduction of "Competition" scheme will be effective. Annual KAIZEN competition can be organized with health facility.

For example, each WIT select KAIZEN theme and work on the theme to improve services annually. WIT applies for Annual KAIZEN competition and presents their KAIZEN activities. QIT and health facility management evaluate their performance of KAIZEN activities in terms of;

- Selected KAIZEN theme and possible benefits for sections and the organization
- Knowledge and technical skills for use KAIZEN process
- Achievement towards to the set target
- Presentation skill
- Team work

Detailed marks of each applicant team are also opened to all staff. This will help WITs to improve weak areas and reduce envy of team awarded.

Introduction at National Level
Recognition scheme at National level is difficult to manage. Central management of recognition scheme costs a lot and takes lots of time to visit health facilities at different level. Therefore, it is recommended Ministry of Health to develop guideline for recognition scheme, and local government health authority or hospital management team conduct recognition activities at respective field.

Competition scheme can be applied at National level. Competition organized by Ministry of Health, and it is held annually to encourage hospital QITs to perform 5S-KAIZEN-TQM activities better for awards. However, it is necessary to carry out the following activities for organizing awards;

- Establish a committee for awarding
- Set different awards
- Develop clear selection criteria for different awards
- Discuss details of awarding event (Venue, date, presenters, prize etc.)

For example, Ministry of Health and Social Welfare (MoHSW), Tanzania is holding annual awarding event. All 5S-KAIZEN implementing hospitals are evaluated with the following criteria. Hospitals that are made good progress compare with previous year will be awarded.

Selection criteria of Most Progress Award (MPA) 1st prize to 3rd prize are as follow.

- Hospital got good results of external evaluation
- Hospital got high rate of improvement from previous external evaluation
- Hospital got high number of sections/departments practicing 5S-KAIZEN-TQM
- Hospital got high number of staff trained on 5S-KAIZEN-TQM

Moreover, MoHSW, Tanzania has other awards related with 5S-KAIZEN-TQM, and those are listed below;
Best Facilitators Award for national facilitators
Best Visual Control Award for best 5S practices using visual control methods

The winners of all awards get trophy from MoHSW at the time of Progress Report Meeting (PRM), and the trophy is handed over in front of PRM participants (in front of representatives from many hospitals). However, there is no prize money given to winners.

V…National Rollout of 5S-KAIZEN-TQM

It is commonly seen that resources are insufficient and it is often seen that these limited resources are not effectively used in developing countries.

There are lots of study carried out on efficacy and utility of 5S-KAIZEN-TQM approaches in manufacturing sector. However, in health sector, improvement of working environment, quality of healthcare, and hospital management in such resource-constrained setting has begun to be demonstrated scientifically in some countries.

Though there are several methods applicable to rollout the approaches to public and private health facilities, this chapter describes how to disseminate 5S-KAIZEN-TQM approaches nationwide in line with other quality improvement initiatives and programs by using the experiences in Tanzania.

In order to rollout the approaches and ensure its sustainability, it is necessary to go through several steps. However, before starting any activity for National rollout of 5S-KAIZEN-TQM approaches, commitment and strong leadership from Ministry of Health is the key for successful rollout of the approaches. The diagram xx illustrates the National rollout model of 5S-KAIZEN-TQM approaches in Tanzania.
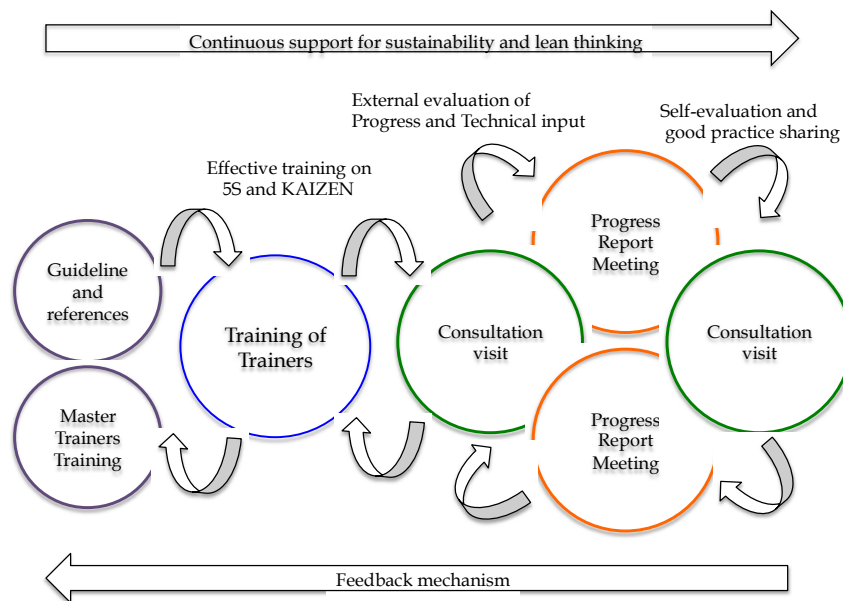
Figure 5-1: National Rollout Model of 5S-CQI (KAIZEN)-TQM approaches in Tanzania

The following sections will explain to you the necessary steps and its methods.

V-1…Policy and Strategy alignment

The first step of rolling out 5S-KAIZEN-TQM approaches is to ensure alignment with existing policy and strategies. First of all, it is recommended to confirm whether policy and strategy on Quality Improvement (QI) exist or not.

Many countries accommodate QI issues into their Health policy and sector strategic plan as one of the cross cutting issues and there is no specific approach identified to improve quality of health care

services. If the existing policy and strategy are mentioning the following issues, alignment of 5S-KAIZEN-TQM concept will be done smoothly;

Total Quality Management
Continues Quality Improvement
Creation of conducive working environment
Team work approach
Occupational health for hospitals staff
Employee satisfaction

If the notion of QI adopted in the policy and strategy does match with the 5S-KAIZEN-TQM concepts, it is necessary to consider how 5S-KAIZEN-TQM concept can contribute to improve quality of healthcare in your country, and to modify health policy and strategies as required. If there is no QI-related policy and strategy, the very first step is to formulate them.

In the case of Tanzania, provision of quality health care was one of the top priorities in the National Health Policy (1990; and revised in 2002; and updated in 2007). The necessity of quality improvement in health care was indicted in Health Sector Strategic Plan II 2003 – 2008, and the current Health Sector Strategic Plan (HSSP) III 2009 – 2015 also features Continuous Quality Improvement (CQI) as one of the cross cutting issues and it is stipulated explicitly in HSSP III that *"Quality improvement is a major aim of the Ministry: in service delivery, in human resources and in management"*. Moreover, Continuous Quality Improvement (CQI) – TQM approach was emphasized in the "Guideline for Reforming Hospitals at Regional and District Levels" to deliver good quality of health services in district and regional hospitals, and other documents such as "The Tanzania Quality Improvement Framework in Health Care 2011 – 2016" also supported to apply 5S-KAIZEN-TQM approaches in health sector in Tanzania.

V-2…Establishment of Pilot Health Facilities on 5S-KAIZEN-TQM

The second step is to select one or two health facilities for piloting 5S-KAIZEN-TQM approaches. The purpose of selecting pilot health facility is to create "Showcase" (model) of 5S-KAIZEN-TQM implementation. The role of "Showcase" is to provide a place that people can learn 5S-KAIZEN-TQM approaches visually and practically, and it makes training of trainers (ToT) more effective by having a model hospital.

There are no clear criteria to select pilot hospital(s) for implementation of 5S-KAIZEN-TQM approaches. However, what is the most important for selection of pilot health facility is to ensure their strong commitment to Quality Improvement and Change of Hospital Management.

It is strongly recommended that successful implementation of 5S activities and its effects observed from pilot health facility should be shared with Ministry of Health. It will help the management of Ministry of Health to understand the efficacy of the approaches, to adopt the approaches as effective tools for change management of health facility, and to back up the national rollout of the approaches.

In Tanzania, the Ministry of Health and Social Welfare selected Mbeya Consultant Hospital as a pilot hospital, and they participated in Asia-Africa Knowledge Co-creation Programme (AAKCP), which was organized by Japan International Cooperation Agency (JICA) in 2007. The feedback of the AAKCP workshops held in Sri Lanka had been given to Chief Medical Officer (CMO) of the Ministry and the best practices in Sri Lanka made him decide to share the concepts of 5S-KAIZEN-TQM with other Ministry officials and Hospital Management Team of Muhimbili National Hospital (MNH). Afterwards, MNH introduced the approaches and started to implement 5S-KAIZEN-TQM activities as another pilot hospital.

V-3…Situation Analysis of Quality Improvement Programs (QIPs) in Country

It is essential to grasp and analyse current situation of existing QIPs in the country subsequently to avoid unnecessary duplications and seek the possibility of collaboration with other QI approaches.

For situation analysis, the following information needs to be collected from relevant departments in the Ministry and development partners;

Principles and methods of the QIPs,
Issues/areas focused in the programs (e.g. Health Care Services in general, Infection Prevention, HIV/AIDS, Maternal and Child Health, Laboratory services etc.),
Target population,
Geographic areas,
Supporting partners and so forth.

All information collected on existing QIPs must be recorded clearly and share with all stakeholders for further harmonization of quality improvement activities

V-4…Development of a National Guideline

The next step is to develop a guideline and teaching materials that can make trainings standardized. Therefore, these documents should be developed before rolling out of the approaches. These documents are also helpful to disseminate 5S-KAIZEN-TQM concepts properly and to train managers and health workers in their facility. Moreover, it will guide all target health facilities in their implementation of 5S-KAIZEN-TQM, which will serve as a foundation of every other quality improvement programs.

It is recommended that the guideline cover both theory and practical methods on 5S-KAIZEN-TQM approaches in order that readers can understand the principles and put it into practice easily. The following table shows the example of contents in "Implementation Guidelines for 5S-CQI (KAIZEN)-TQM Approaches in Tanzania".

Table 5-1: Contents of the national guideline in Tanzania (2nd Edition, November 2011)

> ✓ Acronyms
>
> ✓ Foreword
>
> ✓ Acknowledgement
>
> ✓ Executive Summary
>
> ✓ Chapter 1: Current Situation of QI Activities in Tanzania
>
> ✓ Chapter 2: National Rollout Plan of 5S- KAIZEN-TQM Approaches
>
> ✓ Chapter 3: Basic Concepts of 5S- KAIZEN-TQM
>
> ✓ Chapter 4: Implementation of 5S- KAIZEN-TQM
>
> ✓ Chapter 5: 5S Tools for Actual Implementation
>
> ✓ Chapter 6: KAIZEN Quality Control (QC) Tools
>
> ✓ Chapter 7: Monitoring and Evaluation of 5S-KAIZEN-TQM Activities
>
> ✓ Annex

The contents of the guideline and fundamental idea toward QI in the guideline should align with the existing policy, strategies and guidelines in health sector of the country as mentioned in section 1. If a certain mechanism e.g. supportive supervision to health facilities has already been established, it is important to employ it for or integrate it into implementation of 5S-KAIZEN-TQM and to explain it in the guideline consistently. For the development of the guidelines and the references, department/section that is responsible for QIPs has to take the lead.

In the case of Tanzania, officials from HISU, JICA expert who was assigned to the Ministry as an advisor and senior officers of Mbeya Consultant Hospital who were trained in Japan and Sri Lanka worked together to develop a draft of the 1st "Implementation Guidelines for 5S-KAIZEN-TQM Approaches in Tanzania". They also consulted with QI professionals in other organizations that were implementing QIPs to finalize the guideline.

V-5…Workshops for Master Trainers and Development of Teaching Materials

In the next stage, it is required to ensure master trainers who will train "trainers" in the country and to develop teaching materials that will be utilized for Training of Trainers (TOT). Suitable personnel as a master trainer will be those who are trained well on Quality Improvement. Apart from prospective master trainers, it is also necessary to have the understanding and cooperation of those who are engaged in QIPs at different levels, such as Ministry officials, tutors/lecturers from health training institutions/universities and officials of professional bodies at this stage for further development of the rollout.

In the case of Tanzania, senior officers of Mbeya Consultant Hospital who had participated in the training in Japan and Sri Lanka became master trainers. The Ministry officials from HSIU and other departments, officials from Nurses and Midwifery council, lecturers from universities, those who were engaged in QIPs at MNH and QI professionals from other QIPs were selected as master trainers as well.

In 2008, preparatory meetings had been conducted several times to develop and harmonize teaching materials on 5S-KAIZEN-TQM approaches for trainings of trainers (ToT). It had been tried to integrate some QI approaches with 5S-KAIZEN-TQM so that other approaches would also be taught at the ToT. Targets of ToT, topics to be covered and teaching method of each topic were decided, and teaching materials and timetable of TOT were finalized in participatory manner through the preparatory meetings.

The first TOT was held in the same year based on the developed plan and materials; however, it was not successful. Since 5S-KAIZEN-TQM approaches was taught with other approaches in an integrated way, it made participants confused and they could not understand the meaning of 5S-KAIZEN-TQM approaches appropriately.

Learning from this failure, the master trainers reviewed and modified the topics, timetable and teaching materials so that participants can comprehend concepts and methodology of 5S-KAIZEN-TQM approaches. The teaching materials were also revised to make them easier to understand.

For the development of teaching materials for basic 5S TOT, it is highly recommended to cover extensively from necessity and basic concept of QI to methodology of 5S-KAIZEN-TQM approaches to solidify fundamental QI knowledge of participants who may not know about QI at all. It is quite important to share "what is quality?" among participants who will be trainers at their facilities/organizations so that they can promote QIPs with common ideas of QI.

In Tanzania, Practical Session Guideline for Facilitators was also developed not only for smooth implementation of ToTs but also to standardize the method of practical sessions. The following contents are included in the guideline;

- Objective of each session
- Time allocation
- Method applied in the session
- Teaching process
- Resources (if it is necessary to prepare them in advance)

V-6…Training of Trainers (TOT)

The next step is to train personnel at the Ministry of Health, health facilities, professional bodies, private organizations and local health authorities to be trainers so that the trainings on 5S-KAIZEN-TQM will be taken place at their responsible areas. Through the Training of Trainers (TOT), trained personnel will be certified and recognized as "National" or "Regional" or "District" trainers according to the level of facilities/organizations they belong to.

Their roles are to train their staff on 5S-KAIZEN-TQM approaches, to introduce and implement 5S-KAIZEN-TQM activities at their facilities/organizations, and to monitor and evaluate the activities as a team. After facilities/organizations successfully adopt the concept and take it into practice, they are encouraged to train or provide technical inputs to lower facilities.

ToT is generally provided in stepwise manner. First of all, training on basic 5S approach is conducted, and then training on KAIZEN approach is provided only to qualified facilities/organizations that are practicing S4 (standardize) and S5 (sustain) activities steadily and have created conducive working environment.

In Tanzania, the first ToT on basic 5S that was intended for consultant and regional referral hospitals was conducted in 2008, followed by 2nd and 3rd ToT targeted remaining regional referral and district hospitals in 2009 and 2010. Eight (8) qualified hospitals were invited in 2011 to the 1st TOT on KAIZEN. Since 2011, regional health management teams, council health management teams, district hospitals and association for Christian service and for private health facilities have been trained on basic 5S.

TOT on basic 5S approach normally requires 3 to 5 days depending on the targets and the contents. It covers fundamental knowledge on Quality and its improvement, mind-set changes, QI implementation structures at health facilities, 5S-KAIZEN-TQM concept, 5S implementation method, and Monitoring and Evaluation of 5S activities. It is recommended to teach these topics not only by lectures but also by practical sessions that allow participants to experience 5S activities especially S1 (Sort), S2 (Set) and S3 (Shine) with several 5S tools. If a model hospital/health facility is used as a venue, it is also helpful for participants to observe actual 5S activities there. Table 5-2 shows an example of topics covered in the basic 5S training and teaching methods. In Tanzania,

Table 5-2: Topics covered in Basic 5S ToT and teaching methods in Tanzania

S/N	Topics	Teaching method
1	Framework of Quality Improvement in Health Care	Lecture
2	Definitions and Dimension of Quality	Lecture
3	Quality and Safety	Lecture
4	Responsiveness and Positive attitude	Lecture
5	What is 5S principle?	Lecture
6	5S tools and visual control	Lecture
7	What is KAIZEN	Lecture
S/N	Topics	Teaching method
8	Practice of 5S implementation	Practice
9	Implementation structure, QIT and WITs	Lecture
10	How to conduct situation analysis and Target area selection	Lecture
11	M&E of 5S activities	Lecture/Practice
12	Observation of 5S activities	Observation
13	Action Plan development	Lecture/Practice

TOT on KAIZEN Approach focuses only on how to practice Quality Control Story (QC story). Giving a lecture and the following practical session at every KAIZEN step makes participants understand the objectives of each step and how to use QC tools. KAIZEN training requires approximately 5 days.

Table 5-3: Timetable of KAIZEN training in Tanzania

Day 1		
1	Opening	
2	Pre Assessment	Test
3	5S-KAIZEN-TQM Concept	Lecture
4	KAIZEN Implementation	Lecture
5	KAIZEN Process Step 1: Theme Selection	Lecture
6	KAIZEN Process Step 1: Theme Selection	Practice
7	KAIZEN Process Step 2: Situation Analysis	Lecture
Day2		
8	KAIZEN Process Step 2: Situation Analysis	Practice (QC tool: Pareto Chart)
9	KAIZEN Process Step 3: Root Cause Analysis	
10	KAIZEN Process Step 3: Root Cause Analysis	Practice (QC tool: Fish Bone Analysis)
11	Presentations of Root Cause Analysis	Presentation
Day3		
12	KAIZEN Process Step 4: Identification of counter measures	Lecture
13	KAIZEN Process Step 4: Identification of counter measures	Practice (QC tools: Tree and Matrix Diagram)
14	KAIZEN Process Step 5: Implementation of Countermeasures	Lecture
15	KAIZEN Process Step 5: Implementation of Countermeasures	Practice
16	KAIZEN Process Step 6: Review of the Process and measure effectiveness	Lecture
Day4		
17	KAIZEN Process Step 6: Review of the Process and measure effectiveness	Practice
18	KAIZEN Process Step 7: Standardization of the effective measures	Lecture
19	Monitoring and Evaluation of KAIZEN	Lecture

20	Observation of actual KAIZEN activity	Observation
21	Presentations on field findings	Presentation
Day5		
22	Danger Prediction Training	Lecture/Practice
23	Post Assessment	Test
24	Course summary	
25	Closing	

In order to assess the effectiveness of the trainings, in Tanzania, pre- and post-assessment at the beginning and the end of the trainings are conducted by using a test that measures patients' level of understanding about 5S-KAIZEN. If little progress is seen in test score after the training, or considerable numbers of participants make same mistakes, it is necessary to review and improve the topics in the training, contents of lectures and skills of facilitators.

Course evaluation is also done at the end of trainings in Tanzania to assess the utility of each subject and logistic arrangements using a five-point scale (e.g. Very helpful, Helpful, Fare, Little helpful, Not helpful).

Since strong leadership is obviously a key for successful implementation of 5S-KAIZEN activities, it is recommended to invite leaders and managers to these trainings. For instance, in Tanzania, it was discussed who should be invited and it was suggested to train key personnel in "zone" at the beginning. However, importance of strong leadership and commitment at facility level was pointed out as a key for successful implementation of the approach from Sri Lanka's experiences, and the Ministry developed a strategy to train and Medical Officer in-charge, Matron/Patron and Health secretary (hospital administrator) from each hospital. From local health authorities, medical officers, nursing officers and health administrators can be the targets of the training, and private organization/institutions usually select training officers, human resource officers or quality control officers to be trainers who participate in the TOT.

V-7…Training of health workers at facility level

All trained personnel through TOT of 5S-KAIZEN are expected to share the obtained knowledge and skills with colleagues and subordinates of their facilities/organizations. All teaching materials are given to the participants and they are allowed to use it for "in-house training".
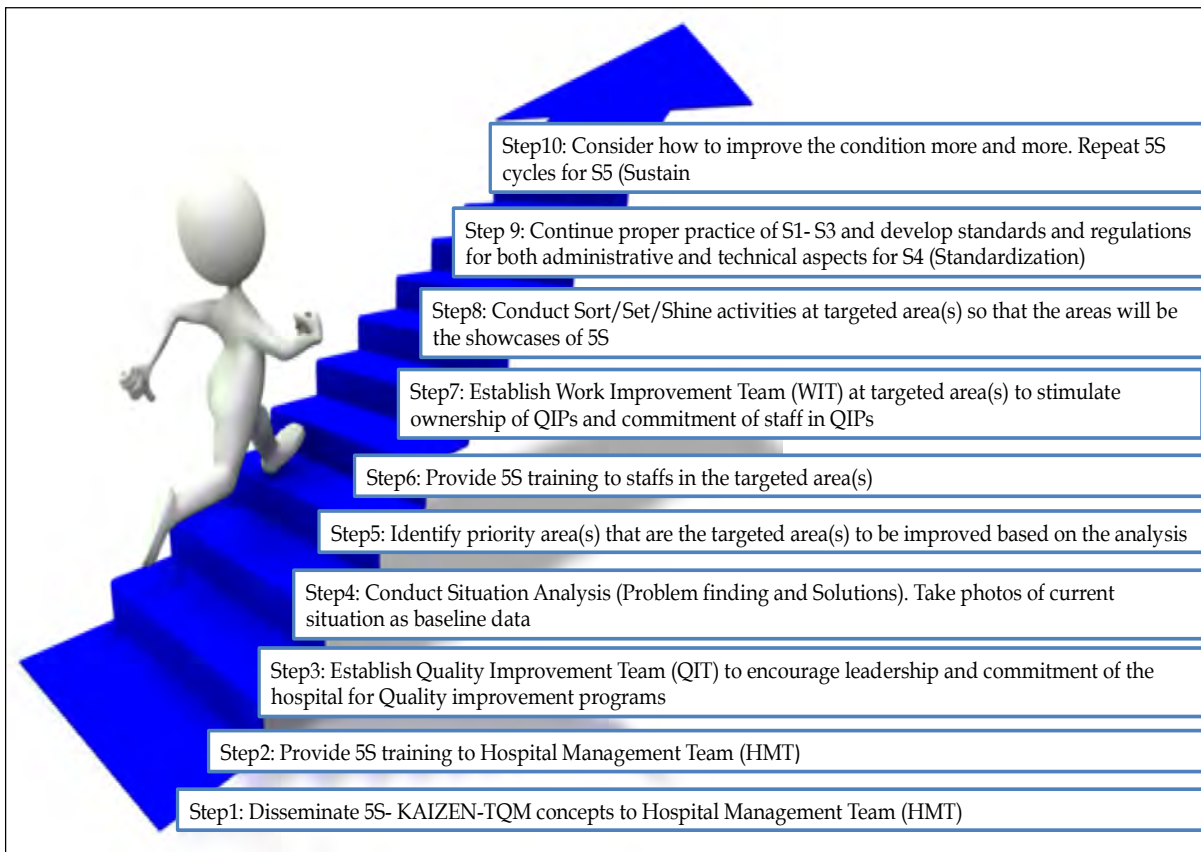
Figure 5-2: Shows the steps for implementation of 5S activities at health facility level

It is observed commonly in health facilities in developing countries that they do not have enough budgets or do not allocate budget for in-house training. Therefore, in Tanzania, it is recommended that Hospital Management Team (HMT) and Quality Improvement Team (QIT) should take care of the followings;

Develop a plan for in-house training and allocate budget for the training by HMT and QIT

Utilize gathering opportunities such as morning report and continuous education session for training of staff

Visit the areas and provide on the job training

Coach the staff during monitoring of 5S-KAIZEN activities
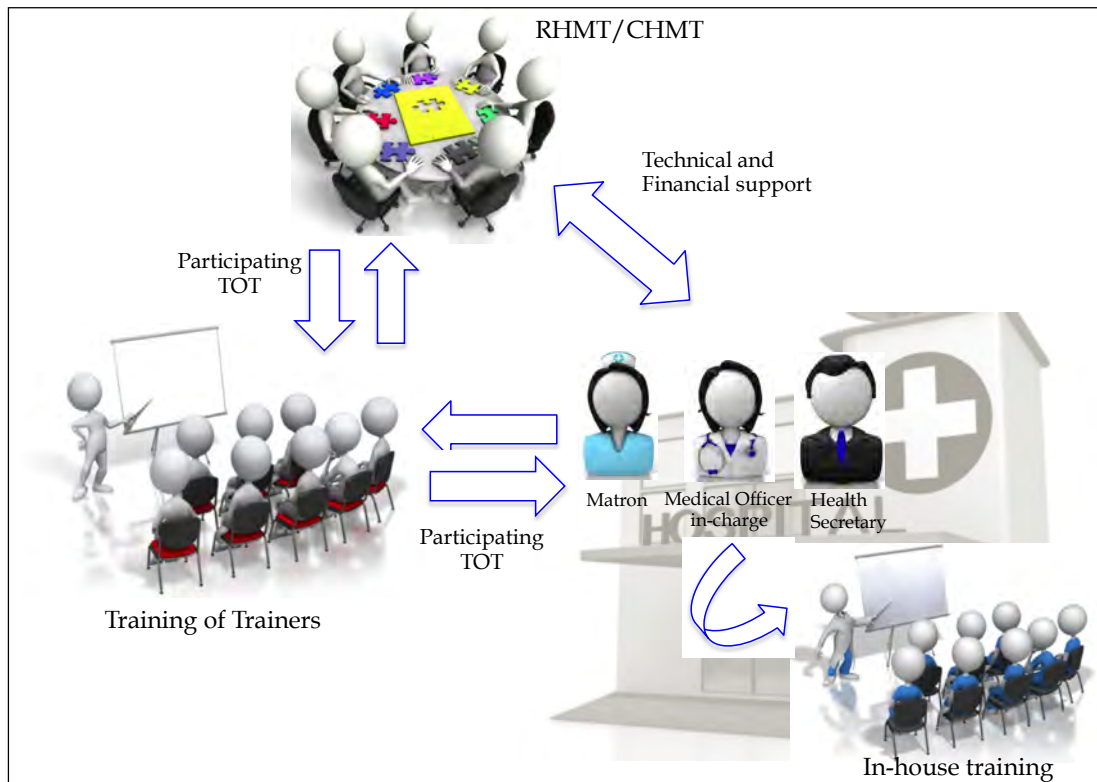
Figure 5-3: Model of cascade training and technical back-up in Tanzania

Once 5S-KAIZEN-TQM activities are implemented, and it starts showing the improvement of working environment at trained facilities, it is expected that they disseminate the 5S-KAIZEN-TQM concepts to other health facilities within the zone/region/district, and conduct trainings.

V-8…Periodical Monitoring and Evaluation

Tanzania's past experiences shows that periodical technical back up and follow-up to the trained hospitals are extremely important for further improvement and sustainability of 5S-KAIZEN-TQM activities. In Tanzania, the following two methods are applied as a periodical monitoring and evaluation.

(1) Consultation visit
MoHSW in collaboration with Regional Health Management Team (RHMT) organize a consultation visit to all the trained hospitals every 6 months to provide technical supports to QIT of hospitals technically on the spot as well as to evaluate the current status of 5S-KAIZEN-TQM activities externally. During the visit, a team of experts obtains information from Hospital Management Team (HMT), QIT and WIT on the following points:

- Implementation structure
- Dissemination and training activities
- Internal monitoring and evaluation activities
- Dialogue between HMT and QIT, QIT and WITs
- Budget of 5S-KAIZEN-TQM approaches implementation
- Changes and improvement

Consultation visit team also observes the progress of 5S- KAIZEN-TQM practices, takes pictures and evaluate the progress with standardized 5S-KAIZEN M&E sheet, which is developed by MoHSW and JICA. The consultation visit team organizes a feedback session on the last day of the visit, and the results of evaluation are presented to QIT and WITs for further improvement.

(2) Progress Report Meeting

MoHSW organizes a meeting to receive reports on the progress of 5S-KAIZEN activities bi-annually. This is called *"Progress Report Meeting on 5S-KAIZEN-TQM approaches"* and all 5S-KAIZEN implementing hospitals are invited to present their progress, challenges and achievements. During the meeting, critiques are made by facilitators and participants for further improvement of activities.
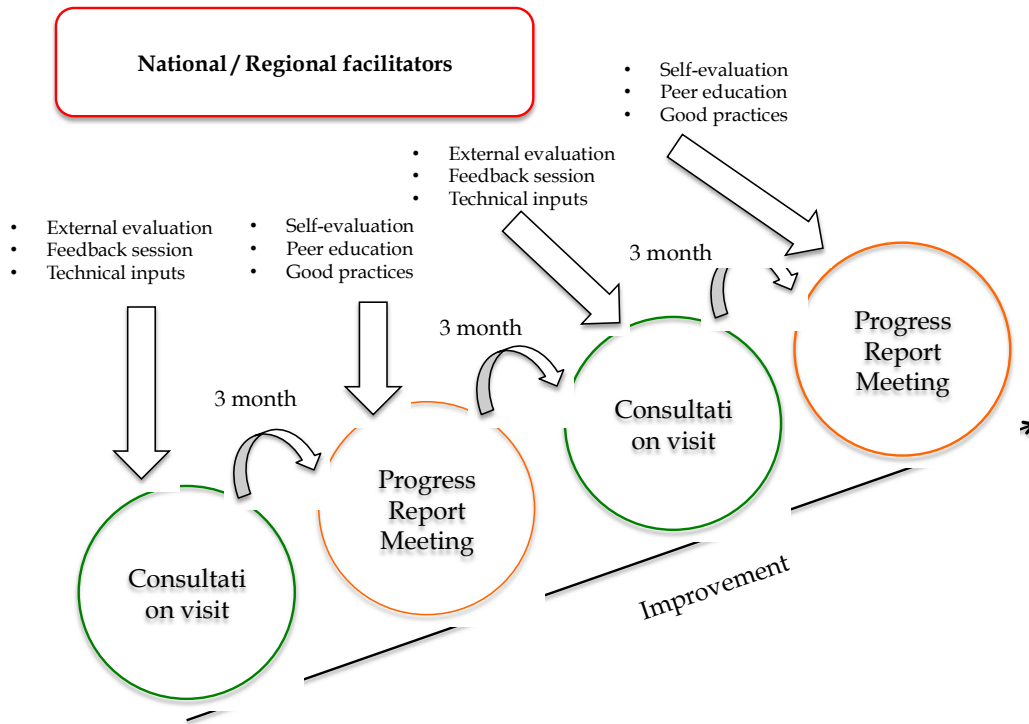

Figure 5-4: Series of intervention

By carrying out consultation visit and progress report meeting alternately, the Ministry is able to monitor their progress at least every 3 months.

VI…Calibration of terminology

VI-1… Terminology

VI-1-1…5S (Sort, Set, Shine, Standardize, Sustain), (Japanese words; Seiri, Seiton, Seiso, Seiketsu, Shitsuke)

S1 = "Seiri" = Sort: Separating needed and unnecessary items, eliminating unnecessary material and tools in the work venue and keeping only essential items. Everything else is stored or discarded. Generally, "Red Tag Strategy" is an entry activity for Seiri.

S2 = "Seiton" =Set: Focuses on efficiency. When we translate this to "Set in Order", it sounds like more sorting or sweeping, but the intent is to arrange the tools, equipment and parts in a manner that promotes work flow. For example, tools and equipment should be kept where they will be used (i.e. straighten the flow path), and the process should be set in an order that maximizes efficiency. For everything there should be place and everything should be in its place. (Demarcation and labeling of place)

S3 = "Seiso" = Shine: Systematic Cleaning or the need to keep the workplace clean as well as neat. At the end of each shift, the work area is cleaned up and everything is restored to its place. This makes it easy to know what goes where, and have confidence that everything is where it should be. The key point is that maintaining cleanliness should be part of the daily work - not an occasional activity initiated when things get too messy.

S4 = "Seketsu"= Standardize: Standardized work practices in a consistent and standardized fashion. Everyone knows exactly what his or her responsibilities are to keep above 3S's. Documentation of the standardized procedure is also important to keep S1, S2 and S3.

S5 = "Shitsuke" = Sustain: making compliance automatic, as a habit. Refer to maintaining and reviewing standards. Once the previous 4S's have been established, they become the new way to operate the organization. Maintain the focus on this new way of operating, and do not allow a gradual decline back to the old ways of operating.

VI-1-2…KAIZEN, (Continuous Quality Improvement, Quality Control; QC)

The term of *KAIZEN* (Japanese for "improvement") is a Japanese word adopted into English referring to a philosophy or practices focusing on continuous improvement in manufacturing activities, business activities in general, and even life in general, depending on interpretation and usage. When used in the business sense and applied to the workplace, KAIZEN typically refers to activities that continually improve working process of a business, from manufacturing to management and from the CEO to bottom line workers.

KAIZEN is a daily activity, the purpose of which starts from simple productivity improvement. It is also a process that, when done correctly, humanizes the workplace, eliminates overly hard work ("muri"), and teaches people how to perform experiments on their work using the scientific method and how to learn to spot and eliminate waste in business processes.

While KAIZEN usually delivers small improvements, the culture of continual aligned small

improvements and standardization yields large results in the form of compound productivity improvement. This philosophy differs from the "command and control" improvement programs of the mid-twentieth century. KAIZEN methodology includes making changes and monitoring results, then adjusting. Large-scale pre-planning and extensive project scheduling are replaced by smaller experiments, which can be rapidly adapted as new improvements are suggested.

The KAIZEN way encourages small day-to-day, continuous and never-ending improvement process involving everyone from managers to workers using the most basic tenet of survival: Common sense. Setting the structure for KAIZEN is very important. This includes appointing self-directed teams that manage to

- Select the target,
- identify present situations,
- analyze problems,
- generate solutions,
- implement measures,
- monitor and evaluate results; and
- prevent setback

The teams need the authority to implement the necessary changes. Everybody needs to be involved. KAIZEN is setting doable, replicable standards and then continually improving those standards—because persistent improvements are crucial for the long-term profits.

KAIZEN, therefore, is not all about incentives and rewards—it is about the support given to front-liners to help them improve the way work is done.

VI-1-3…TQM (Total Quality Management)

Total Quality Management (TQM) is a management approach that aims for long-term success by focusing on customer satisfaction. TQM is based on the participation of all members of an organization in improving processes, products, services, and the culture in which they work. TQM is a comprehensive and structured approach to organizational management that seeks to improve the quality of products and services through ongoing refinements in response to continuous feedback.

"Quality" under TQM means "Meeting customer required quality" and equates to products, processes or services that are "Fit for purpose for all stakeholders". The customer does not mean only external customers, such as patients, but also internal customer, such as employee, and the other customers who receive the benefits.

TQM maintains a companywide strategy that every employee shares responsibility for the quality of their work. TQM also brings the core concept of quality to early transformation processes, starting with initial design and on to working with raw materials to produce finished goods. TQM transcends the 'product quality' approach, involves everyone in the organization, and encompasses its every function administration, communications, distribution, manufacturing, marketing, planning, training, etc. Unfortunately, maximization of efficiency or effectiveness at each section does not reach TQM. Since harmonization of performance by all sections is fundamental, strong leadership by top management and participation of all staff are keys for success of TQM.

TQM can be applied to any type of organization; it originated in the manufacturing sector and has since been adapted for use in almost every type of organization imaginable, including schools, highway maintenance, hotel management, and hospitals definitely.

VI-1-4…PDCA Cycle

KAIZEN and TQM processes are able to be divided into four sequential categories: plan, do, check, and act (the *PDCA cycle*). In the *planning* phase, people define the problem to be addressed, collect relevant data, and ascertain the problem's root cause; in the *doing* phase, people develop and implement a solution, and decide upon a measurement to gauge its effectiveness; in the *checking* phase, people confirm the results through before-and-after data comparison; in the *acting* phase, people document their results, inform others about process changes, and make recommendations for the problem to be addressed in the next PDCA cycle.

PDCA creates a process-centered environment, because it involves studying the current process, collecting and analyzing data to identify causes of problems, planning for improvement, and deciding how to measure improvement (Plan). The plan is then implemented on a small scale if possible (Do). The next step is to determine what happened (Check). If the experiment was successful, the plan is fully implemented (Act). The cycle is then repeated using what was learned from the preceding cycle.

VI-1-5…QC Tools

VI-1-5-1…Fish Bone (Causes – Effects) Diagram

Fish bone diagram is a diagram, shapes like fish-bones for describing cause-effects relationships under the selected problems. The tool is utilized to identify the key issues in the structures and root causes of the present situations.
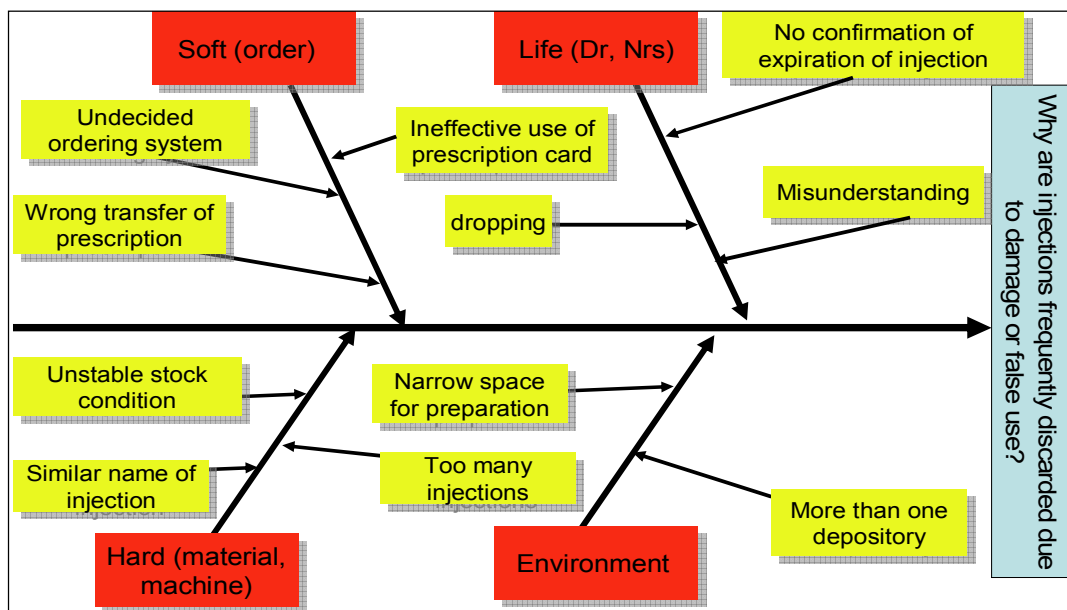

Figure 6-1: Fishbone Diagram

VI-1-5-2…Pareto Diagram

Pareto diagram is a graph which draws a bar graph and a line graph in one sheet. The bar graph describes each number of the selected item in descending order by bars, and the line graph describes commutative number of the selected items aggregating. The diagram is often utilized to identify the present situation in quantities.
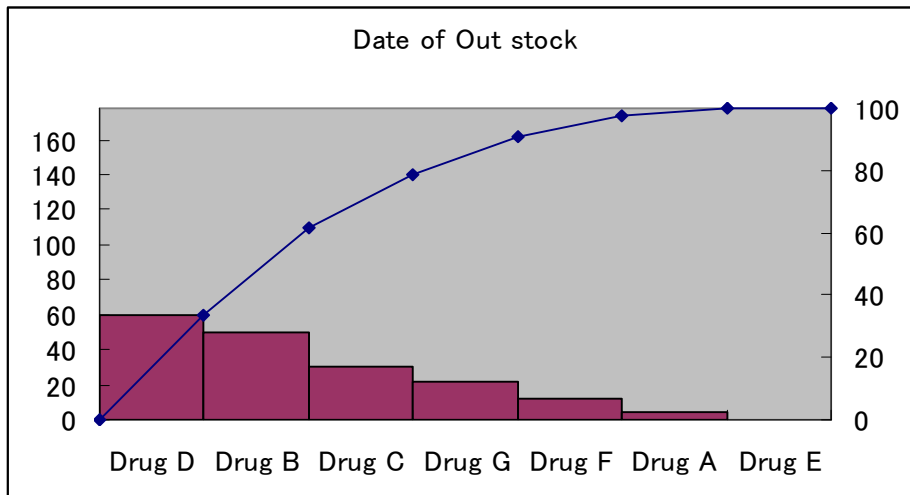

Figure 6-2: Pareto Diagram

VI-1-5-3…Stratification

Stratification is the building up of layers. Stratified is an adjective referring to the arranging of layers. As QC tools, Flow chart is generally utilized for stratification of the subjects. The follow char is able to visualize the process.
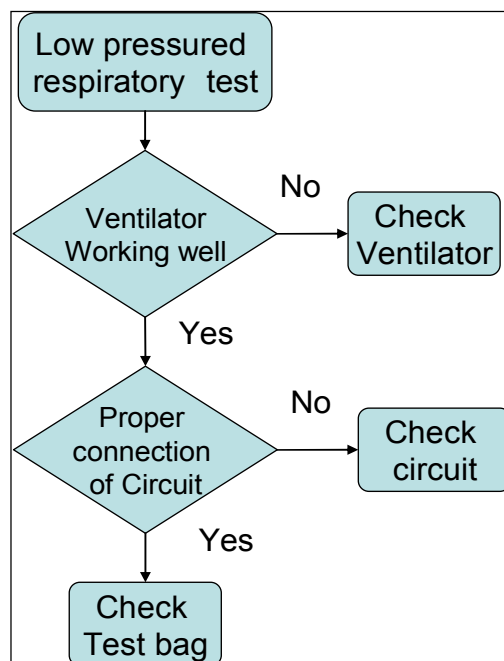
Figure 6-3: Flow Chart

VI-1-5-4…Check sheets

Check sheets are the forms prepared to collect required data by marking simple sign. Target for check should be pre-designed and the form is typically blank one that is designed for the quick, easy, and efficient recording of the desired information, which can be either quantitative or qualitative.

5S Shine Check Sheet

Area	Points	Conditions (1-3)
Wash room	Floor	3 / 3 / 2 / 3 / 2
	Bowl	3 / 1 / 2 / 1 / 1
	Tub	3 / 3 / 2 / 2 / 2
	Dust bin	2 / 3 / 3 / 3 / 3
	Smell	2 / 1 / 2 / 1 / 1

Figure 6-4: 5S Shine Check Sheet

VI-1-5-5…Histogram

Histogram is a graphical display of tabular frequencies and density of the data similar to bar chart. Each bar is erected over an interval, with an area equal to the frequency of the interval. The height of a bar is also equal to the frequency density of the interval. The total area of the histogram is equal to the number of data. The histogram visualizes the trend of the data such average, median, mode and out-layers.
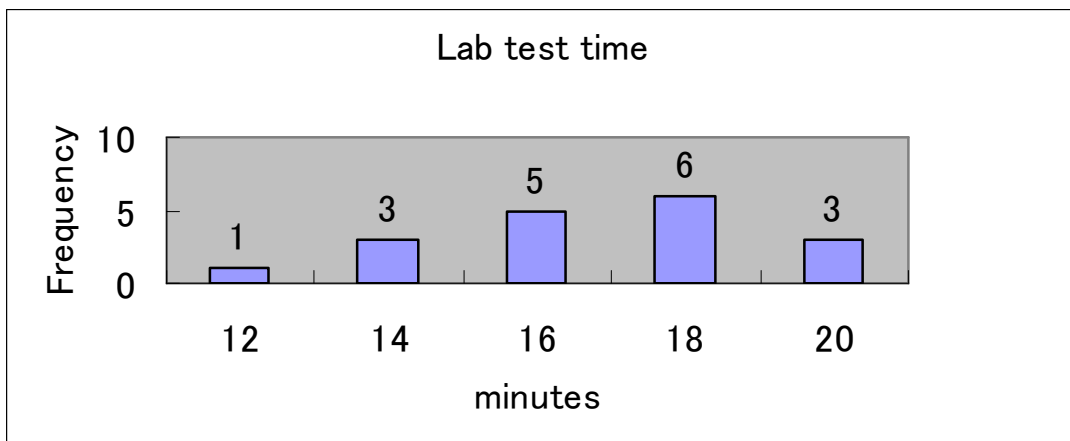

Figure 6-5: Histogram

VI-1-5-6…Scatter diagrams

Scatter graph is a type of mathematical diagram to display values for two variables for a set of data. The data is displayed as a collection of points, each having the value of one variable determining the position on the horizontal axis and the value of the other variable determining the position on the vertical axis. Based on the scatter diagram, a regression curve shall be induced.
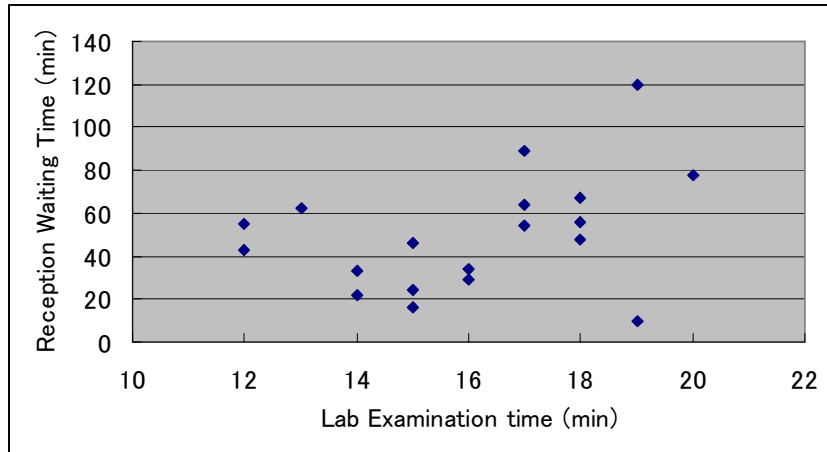

Figure 6-6: Scatter Diagram

VI-1-5-7…Control Charts

Control charts, also known as Shewhart charts, in statistical process control are tools used to plotting data on time line and to visualize whether the plotted data is in between upper control line and lower control line or not and how the plotted date is similar to standard line. The control charts makes easy to monitor the activities in KAIZEN.
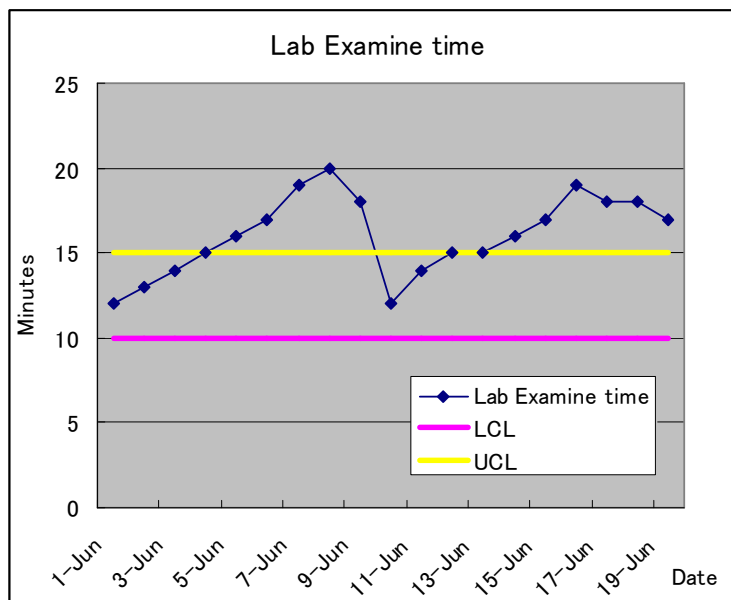

Figure 6-7: Control Chart

VI-1-6…New QC Tools (Seven Management and Planning Tools)

New QC tools are designated for further analysis of qualitative data and decision making.

(i)   Affinity Diagram
Through the brainstorming, there is a lot of disorganized idea appeared. This tool is effective to take such as disorganized idea and information to organize one into groupings based on relationships which the participants discussed. It was created in the 1960s by Japanese anthropologist Jiro Kawakita.
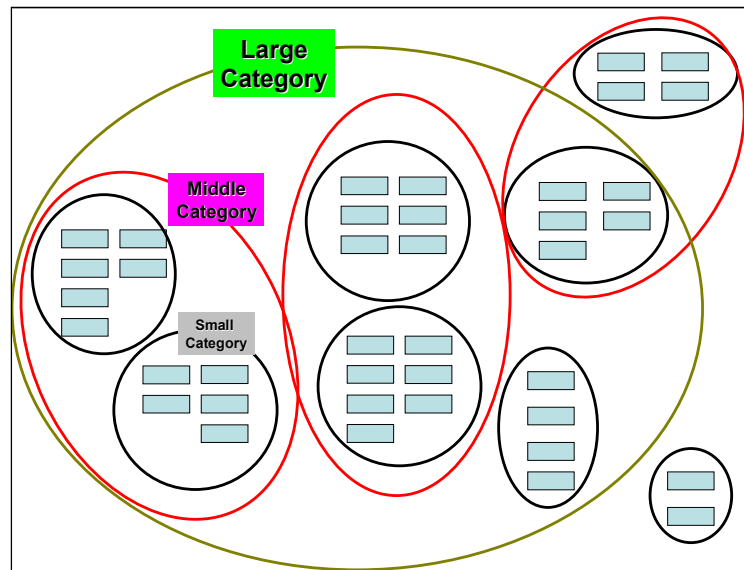

Figure 6-8: Affinity Diagram

(ii)   Interrelationship Diagraph
This tool is effective to display interrelated cause-and-effect relationships complexity of the present issues. Based on designated diagram, the participants discuss which ultimate goals are or which roots causes are.
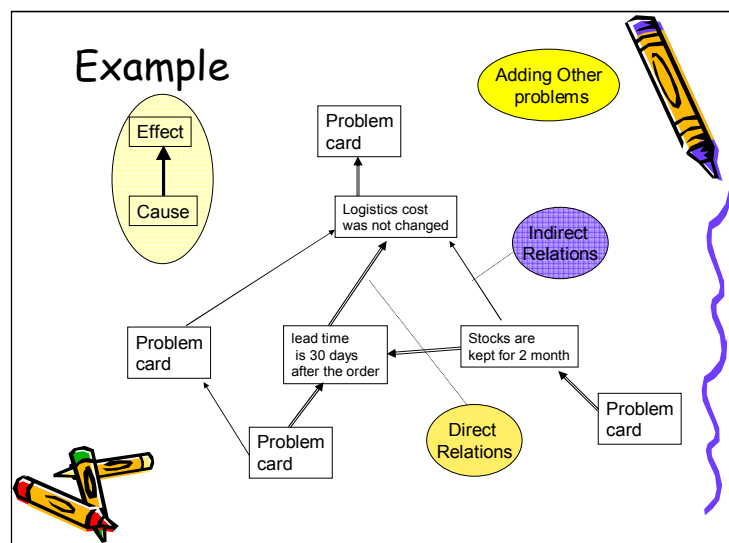

Figure 6-9: InterrelationshipDiagram

(iii)   Tree Diagram

This tool is used to break down the causes called "Why-Because analysis" and to segregate the contents in the issues. The participants develop the diagram to think their idea from generalities to specifics. On the other hand, the tree diagram is also utilized to identify the actual countermeasures against selected problems and it is called "If- Then analysis".
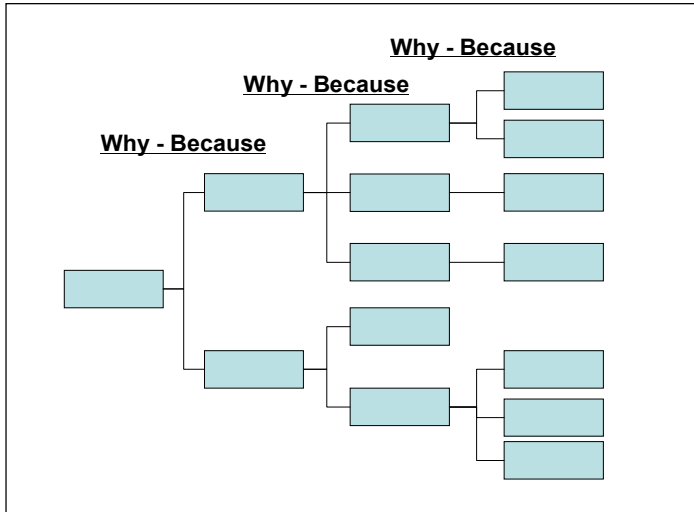

Figure 6-10: Tree Diagram

(iv)   Prioritization Matrix

This tool is also called "Pair-wise Ranking" used to prioritize items one by one and describe them in terms of weighted criteria.

	Drug A	Drug B	Drug C	Drug D	Drug E	Drug F	Drug G	Total
Drug A		A	C	A	A	F	A	4
Drug B			B	D	B	B	B	4
Drug C				D	C	F	G	2
Drug D					E	D	D	4
Drug E						E	G	2
Drug F							F	3
Drug G								2

Figure 6-11: Prioritization Matrix

(v)   Matrix Diagram

This diagram is used to analyze the problem in the target by two additional factors, arranged in two-dimensional matrix. At each intersection a relationship is either absent or present. It then gives information about the relationship, such as its strength, the roles played by various individuals or measurements.

(vi)   Process Decision Program Chart (PDPC)

This Chart is used to identify the process for achievement and to describe all objective measure and to break down tasks into a hierarchy. The participants decided the best route to the solution

The PDPC extends the tree diagram a couple of levels to identify risks and countermeasures for the bottom level tasks. Different shaped boxes are used to highlight risks and identify possible countermeasures.

(vii)   Activity Network Diagram (Arrow Diagram)

This tool is a method for finding the best route from the process flow chart of the arrow a complex task and planning the appropriate sequence or schedule for a set of tasks and related subtasks. It is used when subtasks must occur in parallel. The diagram enables one to determine the critical path (longest sequence of tasks). PERT diagram is one of the activity networking diagrams.

VI-1-7…Other tools

In the contexts of International Development, multilateral or bilateral aid agencies provide several types of planning and analysis tools. The tools are effective to analyze situations, problems and solutions in KAIZEN process.

VI-1-7-1…Project cycle Management Approach (PCM)

Originally, the Project Cycle Management (PCM) approach is a concept to manage the project phases which is comprised of three phases of planning, implementation, and evaluation phase, as a cycle like Plan –Do- See or PDCA cycle. The analysis tools in the planning phase are effective for KAIZEN activities.

Stakeholder analysis
Any individuals, groups of people, institutions or firms that may have a significant interest in the success or failure of a hospital activates are defined as 'stakeholders'. A basic premise behind stakeholder analysis is that different groups have different concerns, capacities and interests, and that these need to be explicitly understood and recognized in the process of problem identification, objective setting and strategy selection.
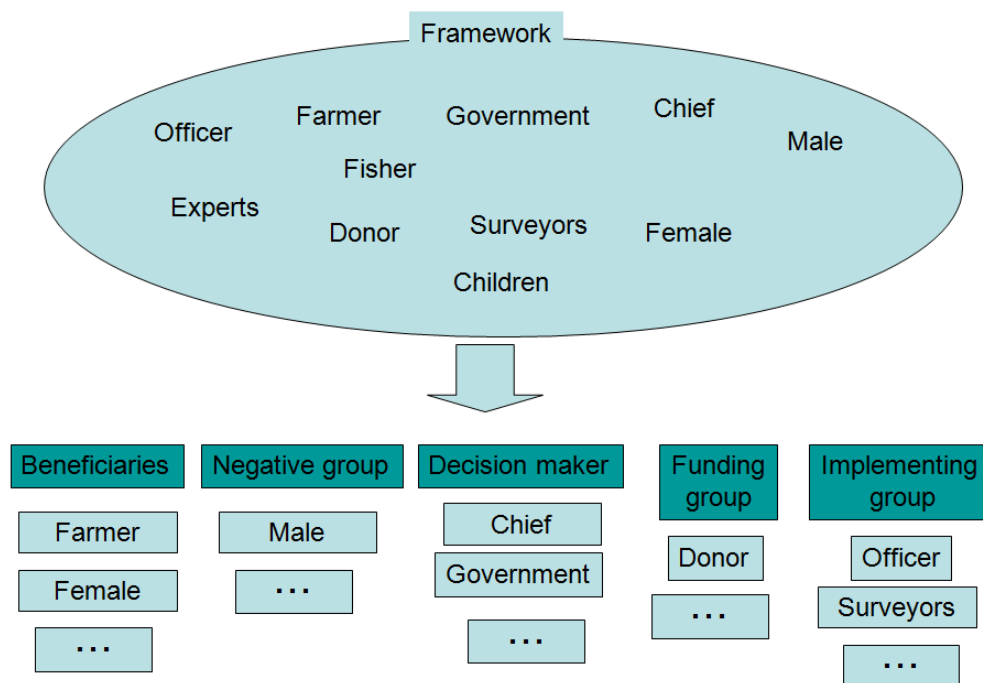

Figure 6-12: Prioritization Matrix

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Problems Analysis

Problem analysis identifies the negative aspects of an existing situation and establishes the 'cause and effect' relationships between the identified problems. It is useful to identify the structure of the problems and root problems in the current negative situation. It involves three main steps:

1. Definition of the framework and subject of analysis by situation analysis
2. Identification of the major problems faced by QC circle or the department (What is/are the problem/s? Whose problems?)
3. Visualization of the problems in form of a diagram, called a "problem tree" o to help analyze and clarify cause–effect relationships.
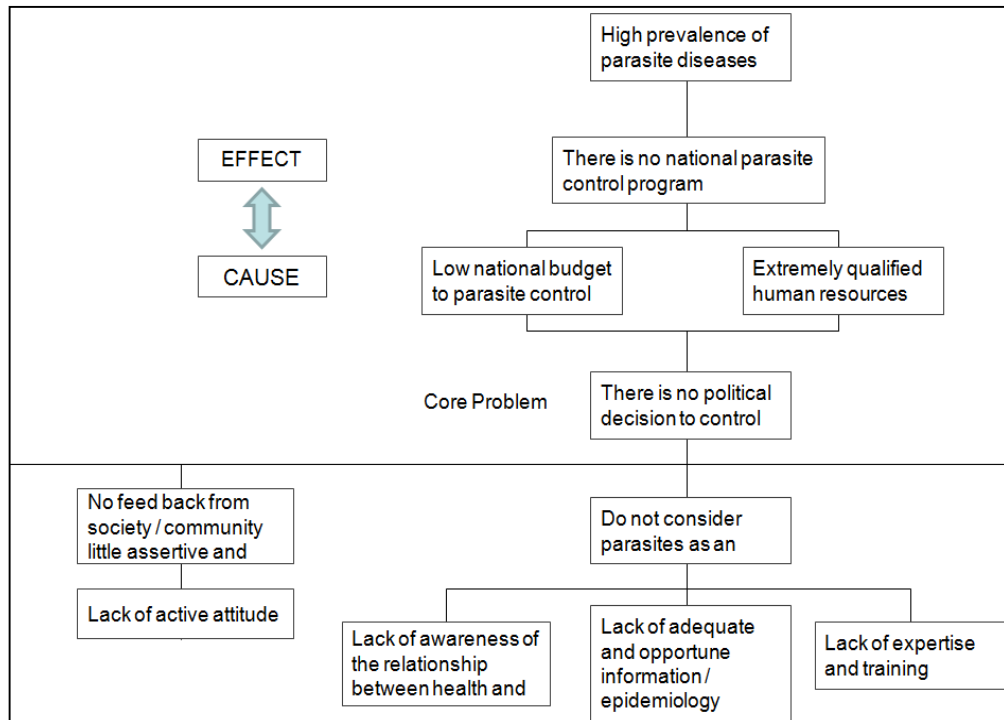

Figure 6-13: Problem Analysis

Objectives Analysis

Objective Analysis illustrates the future situation that would be achieved by solving the problems. The analysis lays the project objectives out in a means and ends tree with roots and branches showing relationships between objectives.

The 'negative situations' of the problem tree are converted into solutions, expressed as 'positive achievements'. For example, 'Poor sanitary condition' is converted into 'Sanitary conditions improved'. These positive achievements are in fact objectives, and are presented in a objectives tree showing a means/ends relationship
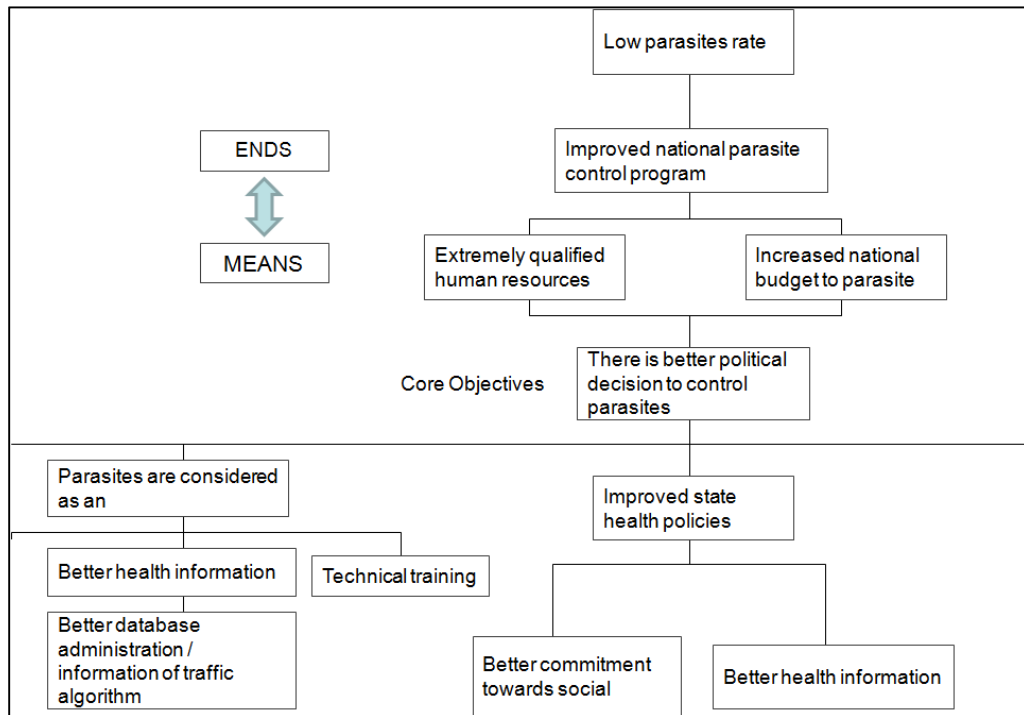
Figure 6-14: Objective Analysis

VI-1-7-2…SWOT Analysis

SWOT analysis (strengths, weaknesses, opportunities and threats) is used to analyze the internal strengths and weaknesses of an organization (hospital or department) and the external opportunities and threats that it faces. It can be used either as a tool for situation analysis, or problem analysis. SWOT is undertaken in three main stages, namely:

Ideas are generated about the internal strengths and weaknesses of a QC circle, department or hospital, and the external opportunities and threats;
The situation is analyzed by looking for ways in which the circle/department / hospital's strengths can be built on to overcome identified weaknesses, and opportunities can be taken to minimize threats; and
A strategy for making improvements is formulated (and then subsequently developed using a number of additional analytical planning tools).

Table 6-1: SWOT Analysis

Strengths	Weaknesses
-Good leadership -Good reputation for improvement	-Not enough 5S skill -Low retention rate
Opportunities	Threats
-Performance based budget allocation -5S Seminar	-Poor sanitation in township -Epidemic transition

VI-1-7-3…X-Y analysis (Matrix Analysis)

X-Y analysis is identified the performance of specific portfolios under different circumstances (X axis and Y axis). The subjects under the current situations related your circle themes are categorized in each box. You can arrange the matrix like followings depends on the theme of the circle activities.
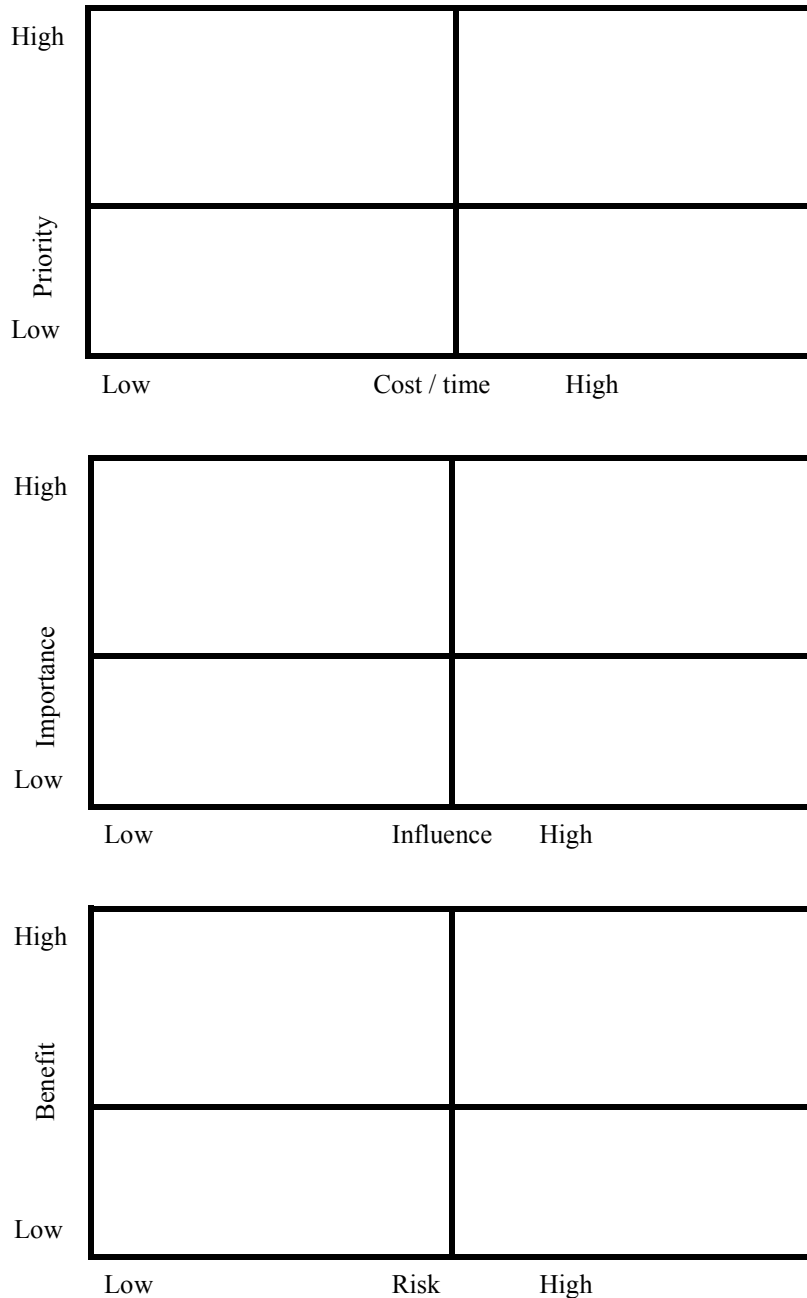
Figure 6-15: Matrix Analysis

VI-1-8…JIT (Just in Time)

JIT, or "just in time," is a strategy used in inventory management. With the JIT strategy, companies aim to decrease waste of stocks and inventory costs by receiving goods only when they are needed to produce products. JIT inventory management thus increases efficiency, and is used by companies that prefer to keep low inventory levels. Under JIT management, shipments are made within rigidly

enforced "Time windows" and all items must be within the specifications with very little or no inspection. It was developed and perfected by Taiichi Ohno of Toyota Corporation during 1960s and 70s to meet fast changing consumer demands with minimum delays.

VI-1-9…TPM (Total Productivity Maintenance)

TPM (Total Productive Maintenance) is a maintenance philosophy designed to integrate equipment maintenance into the manufacturing process. Though the main management target is quality of products or services in TQM, the facilities for products are the main management target in TPM. The goal of any TPM program is to eliminate losses tied to equipment maintenance or, in other words, keep equipment producing. As maintenance issues are addressed and total productive maintenance programs implemented, the true value of TPM begins to emerge. Just as lean manufacturing relies on KAIZEN or continuous improvement; continuous re-evaluation of the maintenance cycle allows for kAIZEN in maintenance programs. TPM are not giving people more work or the least important of maintenance tasks. TPM really are empowering them to learn more, be more valuable; and the cleaning and lubrication are very important tasks.

VI-2…Other methods
VI-2-1…FTA (Fault tree analysis)
Fault tree analysis (FTA) is a failure analysis in which an undesired state of a system is analyzed using Boolean logic to combine a series of lower-level events. This analysis method is mainly used in the field of safety engineering to quantitatively determine the probability of a safety hazard.

VI-2-2…FMEA (Failure Modes and Effects Analysis)

Failure Modes and Effects Analysis (FMEA) is a method to analyze potential reliability problems in the development cycle of the project, making it easier to take actions to overcome such issues, enhancing the reliability through design. FMEA is used to identify actions to mitigate the analyzed potential failure modes and their effect on the operations. Anticipating these failure modes, being the central step in the analysis, needs to be carried on extensively, in order to prepare a list of maximum potential failure modes.

VI-2-3…RCA (Root cause analysis)

Root cause analysis (RCA) is a class of problem solving methods aimed at identifying the root causes of problems or events. The practice of RCA is done after an event has occurred. By gaining expertise in RCA it becomes a pro-active method. This means that RCA is able to forecast the possibility of an event even before it could occur. By directing corrective measures at root causes, it is hoped that the likelihood of problem recurrence will be minimized. RCA is often considered to be an iterative process, and is frequently viewed as a tool of continuous improvement.

VI-2-4…IE (Industrial Engineering)

The branch of engineering that is concerned with the efficient production of industrial goods It employs certain techniques (such as floor layouts, personnel organization, time standards, wage rates, incentive payment plans) to control the quantity and quality of goods and services produced.

VI-2-5…VE (Value Engineering)

It is an organized approach to providing the necessary functions at the lowest cost and elimination of unnecessary cost. Unnecessary cost is cost which provides neither use, life, quality, appearance nor customer features.

From the beginning the concept of value engineering was seen to be cost validation exercise, which did not affect the quality of the product. The straight omission of an enhancement or finish would not be considered value engineering.

VI-2-6…OR (Operation Research)

Application of scientific and mathematical principles to business decisions; also called *management science*. Operations research concerned with the development of mathematical models of repetitive activities, using numerous variables, such as traffic flow, assembly lines, military campaigns, and optional production scheduling. Operations research makes extensive use of computer simulation. Manufacturers use operational research techniques to schedule production processes, to schedule tasks necessary to complete complex projects, and to optimize production work flows. Comparing to experimental design method, operation research is more practical to improve the management.

VI-2-7…Brain Storming

Group session of executives from different business disciplines, where new ideas are expressed to solve a business situation or formulate corporate policy. No criticism of the ideas is allowed. However, the ideas may be modified or combined. The purpose of the session is to come up with originality in thinking based on gut feelings without inhibitions.