The Sankalpa: International Journal of Management Decisions
ISSN: 2454-7425
Volume 12, Issue 1 (January – June 2026)

The Role of the Japanese Kaizen Strategy in the Continuous Improvement of the Production Process
A Case Study of the Boumaiza Food Industry Complex in – Skikda – AGRODIV Group

Loudjani Aziz [1], Zedira Charef Eddine[2]
[1,2]Abbas Laghrour University – Khenchela –
Laboratory of Sustainable Development, Startups, and Finance
E-mail: [1]loudjani.aziz@univ-khenchela.dz
E-mail: [2]zedira.charefeddine@univ-khenchela.dz

Received: 05-02-2026 **Accepted: 28-05-2026** **Published:04-06-2026**

Abstract :
This study aimed to examine the role of applying the Kaizen continuous improvement methodology in improving the production process at the AGRODIV food industry complex in Boumaiza, Skikda, with particular focus on reducing raw material losses, especially tomatoes. A descriptive approach was adopted to collect data from the complex, and the collected data were analyzed using the Pareto chart and Ishikawa diagram as key tools of the Kaizen continuous improvement methodology. The study found eight cases of raw material loss at the plant. These losses occurred at different rates, with three cases accounting for 80.82% of the total raw material loss, while the remaining five cases represented 19.18%.
Keywords : Continuous improvement; strategy; Pareto chart; Ishikawa diagram

1-Introduction

Due to technological advancements and the expansion of international communication networks, the contemporary business environment has witnessed rapid growth in international trade and a significant increase in trade volume. The internet has also contributed to transforming financial and business activities into a more interconnected global system. However, this development has not prevented organisations from facing several operational challenges, including raw material losses, intensified competition among companies, and structural changes within some organisations.

As a result, contemporary organizations seek to maintain their market position in line with the requirements of international business transactions while strengthening their competitive advantage. To achieve this, they are required to continuously improve their production processes and reduce additional costs, thereby enabling them to produce goods at lower costs and compete effectively in highly competitive markets. In this context, the application of the Japanese Kaizen methodology for continuous improvement has become necessary, as it helps reduce the obstacles that hinder organizational growth and contributes to increasing market share. This approach focuses on improving three key factors that affect cost reduction : the effort required, production costs, and the time consumed during the production process.

The aim of this study is to apply the Japanese Kaizen methodology to improve the production process at the Boumaiza Food Industries Complex, a subsidiary of the AGRODIV Group. This is achieved by monitoring the different forms of tomato waste during production, given that tomatoes are one of the complex's main products. The findings are then intended to be extended to the complex's other products. The study also provides management with suggestions and recommendations aimed at improving the production process and reducing costs through the adoption of the Kaizen continuous improvement approach. This would enable the facility to reduce manufacturing costs and enhance the organization's competitive advantage.

1-1 Problem Statement

Many organisations today face difficulties in controlling indirect production costs, which widens the gap between planned and actual performance. One of the main challenges in this regard is the increasing rate of raw material waste, which represents a major obstacle to cost reduction, reduces profitability, and weakens competitive advantage as product costs rise. Therefore, there is a need for a more effective approach to minimising raw material waste and improving cost control. By applying the Japanese Kaizen methodology to monitor raw material waste and continuously improve the production process, organisations can reduce unnecessary costs, make better use of available resources, and strengthen their competitive advantage.

1-2 The Main Problem

This study is based on the following main research question:

To what extent does the Japanese Kaizen strategy contribute to the continuous improvement of the production process at the Boumeiza Food Industries Complex in Skikda?

To answer the main question above, the following main hypothesis was formulated :

"The Japanese Kaizen strategy contributes to the continuous improvement of the production process at the Boumeiza-Skikda Food Industries Complex."

1-3 Objectives of the Study

The study aims to achieve the following objectives :

1. To explain the scientific framework of the Japanese Kaizen methodology and its role in the continuous improvement of the production process.
2. To develop a practical framework for applying Kaizen tools to improve the production process.
3. To explore how Kaizen tools can be used effectively to support continuous improvement within the organization.
4. To derive scientific findings and methodological recommendations that can be applied within the organization to improve its overall performance.
5. To demonstrate the role of Kaizen strategic mechanisms in influencing the structure of production costs within the organization.

1-4 Significance of the Study

The importance of this study lies in the following aspects:

1. It seeks to establish the Kaizen methodology within the managerial practices of Algerian organizations and to apply it as a means of improving financial and administrative performance, with the aim of achieving excellence and enhancing global competitiveness.
2. It aims to promote a Kaizen-based organizational culture among members of Algerian organizations, thereby fostering initiative, creativity, and active participation in continuous improvement.
3. It contributes to creating a work environment based on continuous improvement in production processes, supported by teamwork and collective commitment to organizational objectives.
4. It highlights the external competitive pressures faced by Algerian industrial institutions and, consequently, the need to adopt the Kaizen continuous improvement strategy to ensure sustainability, maintain market share, and achieve target costs.
5. It attempts to employ analytical tools associated with the Kaizen strategy, particularly the Pareto chart and Ishikawa diagram, to address raw material waste in an Algerian industrial institution, with the possibility of extending the results to other products.

1-5 Research Methodology

To ensure the methodological and practical soundness of the study, a descriptive analytical approach was adopted to address the theoretical aspects of the study variables. In addition, a case study approach was used for the applied aspect, focusing on the Boumeiza Food Industries Complex in the province of Skikda, affiliated with the AGRODIV Group.

1-6 Previous Studies

Numerous studies have addressed the Kaizen strategy for continuous improvement, including

- **Boursass's study (2023) titled "Kaizen as a Strategy for Improving Human Resource Performance : A Case Study of Amor Benamor Mills – Guelma"**

The objective of this study was to assess the impact of the Kaizen strategy on human resource performance at the Amor Benamor Mills. The performance of the human resources department was measured based on key performance indicators such as a culture of continuous improvement, a culture of eliminating time waste, and the establishment of work rules. Thirty questionnaires containing questions on the study variables were prepared and distributed to the institution's staff, yielding the following results :

-The performance of human resources at the Amor Benamor Mills is characterized by quality and excellence in work

- The Kaizen strategy is implemented at the Amor Benamor Mills organization

-There is a direct relationship between employee performance at the Amor Benamar Mills and the use of the Kaizen strategy

- **Mammeri's study (2022) titled "Modern Approaches to Improving Organizational Performance (The Kaizen Model as an Example)"**

The objective of this analytical study was to identify the modern approaches that play a prominent role in the process of improving employee performance according to the Kaizen

model. Various concepts related to this strategy and the principles upon which it is based were addressed. The study concluded with the following findings :

- The Kaizen model plays an effective role in improving employee performance, whether in terms of achievement or productivity.

-Performance improvement is a reflection of the capabilities and motivations of managers and leaders within the organization.

-Implementing the Kaizen strategy allows for addressing various work-related pressures and problems.

- **Ben Ouda's study (2021), titled "The Kaizen Continuous Improvement Methodology of and Its Relationship to the Promotion of Work Ethics within the Framework of Organizational Governance Standards"**

The aim of this study was to examine the relationship between the continuous improvement strategy and its effectiveness in improving and developing work ethics within the framework of corporate governance. This is because corporate governance is critical in the financial and business markets and is one of the principles of corporate governance. The study made the following recommendations, which are to be considered for implementation :

- Strive to promote a culture of continuous improvement within the organization and adopt the concepts of total quality management.

- The need to focus on a culture of work ethics within the framework of corporate governance to foster a fair competitive environment.

- **Study by Alwan and Taloush (2020) titled "The Role of Kaizen as a Modern Approach to Organizational Change in Improving Tax Performance : The Tax Directorate of the Province of Khenchela as a Case Study"**

The objective of this study was to ascertain the extent to which the Kaizen approach can contribute to tax performance enhancement. The study was conducted using a questionnaire, 30 copies of which were distributed to staff at the Tax Directorate of the Province of Khenchela. The study concluded with the following findings :

- There is a statistically significant impact of Kaizen on improving tax performance at the Tax Directorate of the Province of Khenchela

- Kaizen contributes to improving tax performance by simplifying administrative tax collection procedures.

1-7 Advantages of the current study over previous studies :

The present study corroborates earlier research on the significance of the Kaizen strategy and its effective role in continuous improvement within organisations. However, the present study diverges from previous studies in that it is an applied study conducted in one of the most significant industrial institutions within the food industry complex. The methodology employed is that of Kaizen, which is focused on continuous improvement. The process of raw material loss in tomato production is the focal point of the study, and measures are proposed to reduce waste or loss of this material at the institutional level. Previous studies focused on the human aspect and performance within organisations.

First : Theoretical Framework of the Study

1-The Origins of the Japanese Kaizen Performance Improvement Methodology

The term "Continuous Improvement" (CI), also known as "Kaizen" in Japanese, has its origins in Japan. Following the economic challenges of World War II, the Japanese government initiated reconstruction efforts, leading many Japanese companies, including Toshiba in 1946, Matsushita Electric in 1950, and Toyota in 1951, to adopt continuous improvement programs. This event signified the onset of Japan's industrial revolution. (Jablaq, 2021, p. 111)

1.1-The Concept of the Kaizen Strategy

The concept of the Kaizen strategy has attracted the attention of many thinkers ; in this regard, we highlight the most important definitions of this term:

First Definition : "It is a philosophy that recognizes management's role in continuously encouraging and implementing continuous improvements that involve every individual in the organization, which can be achieved at no cost or at minimal expense without the need for complex or expensive tools, and which focuses on simplification by breaking down complex processes into their subcomponents and improving them." (Hassan Al-Nafrawi, 2013, p. 111)

Second Definition : "It is a daily improvement effort undertaken by all members of the organization, everywhere, to control deviations in operations and prevent their recurrence, using the questions **'Where, Why, When, What, Who, and How'** to identify and address the root causes of problems, rather than merely addressing their effects or consequences. The secret to this strategy's excellence lies in its philosophy of continuous improvement: that what we do today is better than yesterday, and what we do tomorrow is better than today" (Mammeri,2022,p:36)

Third Definition : "Continuous improvement is a concept that asserts a workplace where everything is subject to continuous evaluation, prevention is preferable to cure, and the emphasis is on doing things correctly and efficiently from the outset " (Maamari, 2022, p. 36)

Forth Definition : Masaaki Imai, the spiritual father of Japanese Kaizen, defines it as " In Japanese, it means 'continuous improvement'. This term encompasses improvements that involve all employees, from all levels of the organisation, and implies low cost. The Kaizen philosophy is based on the idea that, in all aspects of our lives – professional, social, or family-related – we should focus on making continuous improvements. This concept is so ingrained in Japanese culture that many people do not realise they are practising it." (Masaaki, 2012, p. 14)

As outlined in the above definitions, Kaizen methodology may be defined as an approach that involves daily monitoring, with the objective being the identification of minor problems faced by an organisation on a regular basis. The implementation of such solutions allows for the optimisation of resources, leading to enhanced efficiency and the generation of substantial results.

1-2 The Origins of the Kaizen Methodology of Continuous Improvement :

The philosophy or methodology of continuous improvement was first developed in Japan after the end of World War II, when the Japanese economy, and in particular Japanese industry, were in a state of significant decline. A series of simple improvements were

introduced by General Douglas MacArthur during the reconstruction of the country to help it to recuperate and rejuvenate. He recognised the need to improve Japanese efficiency and raise its labour standards. Consequently, the United States sent a team of experts led by William Edwards Deming to provide training courses for Japanese companies. The Japanese were impressed by this new management approach centred on continuous improvement and named it "Kaizen" in their language, which means "good change." This strategy developed in Japan and then returned to the United States thanks to the spiritual father and Japanese business consultant and author of organizational theories, Masaaki Amai, where the Japanese Kaizen methodology was launched in 1985. (Draman and Al-Idrissi, 2024, pp. 521–522)

1-3 Principles Underlying the Kaizen Continuous Improvement Methodology

The Kaizen methodology for continuous improvement in organizations is based on a set of principles, namely: (Masoudi and Tawiti, 2023, pp. 52–53)

- ✓ Making daily improvements in the organization, as not a single day should pass without introducing improvements, even if they are minor.
- ✓ Nothing is beyond improvement ; everything can and should be improved.
- ✓ Instead of offering criticism, one should suggest any appropriate improvement, even if it is simple.
- ✓ Any management activity should ultimately lead to increased customer satisfaction with the organization's products or services.
- ✓ Try to anticipate customers' desires and preferences and strive to fulfill them immediately to increase customer satisfaction.
- ✓ Prioritize quality over profit, as any organization can grow and thrive if it earns customer satisfaction with its products and services.
- ✓ Attempt to build an organizational culture that encourages employees to acknowledge the existence of problems within the organization and to propose appropriate solutions in a timely manner.

2. Steps for Implementing the Kaizen Continuous Improvement Methodology

One of the most important strategies relied upon in continuous improvement is what is known as the "Deming cycle", also known as the "Shewhart cycle." This cycle was discovered in the 1950s as one of the simplified cycles for continuous improvement ; therefore, the "Deming cycle" will be relied upon in this study as one of the tools for the independent variable, which is continuous improvement.

The following figure is a diagram of the Deming cycle, abbreviated as PDCA, which primarily relates to the main steps for applying the Kaizen methodology. (Draman and Al-Idrisi, 2024, p. 524)

The letters refer to:

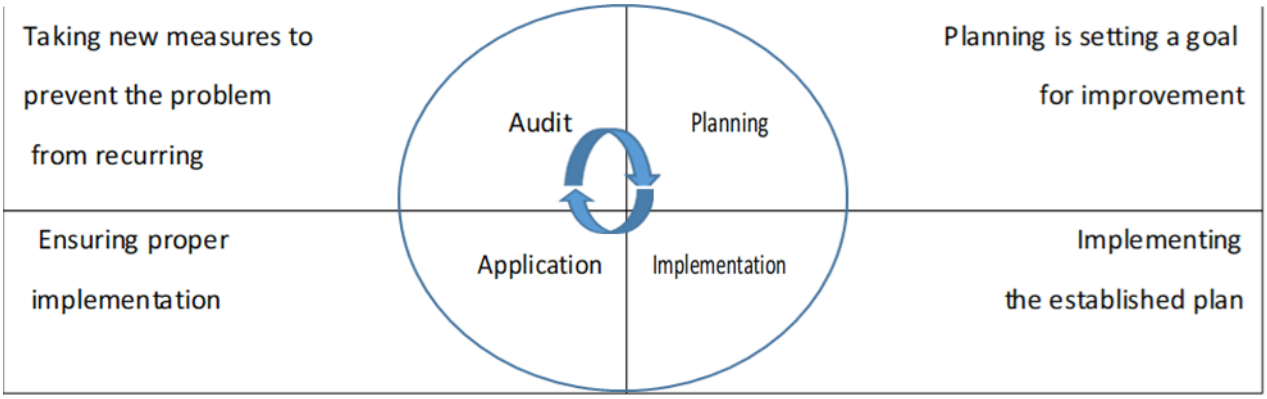
P: Planning, i.e. the development of plans to improve quality after gathering and analysing all necessary information in advance.

D: Implementation of the plan within the scope of the existing problem.

C: Checking, i.e. the evaluation of the results obtained.

A: The results obtained should be implemented or applied, and an attempt should be made to generalise them to the rest of the products or services within the organisation.

Figure 1:Represents the Deming Cycle



Resource: (Draman and Al-Idrissi, 2024, p. 524)

3-Tools for Applying the Kaizen Methodology

In this study, we will focus on the most important tools for applying the Kaizen continuous improvement methodology, namely the Pareto chart and the Ishikawa diagram, given their importance in analyzing the problem under study

3-1 The Pareto Chart

3-1-1 Definition of the Pareto Chart

The Pareto chart, also known as the Pareto curve, is a graphical representation used to illustrate the frequency of occurrence of problems in a production process. This methodical approach enables the identification of the most impactful problems within the organisation (Kortel and Kahila, 2010).

According to Pareto, 80% of workplace issues are minor, yet 20% of these are given due consideration. This phenomenon is known as the 80/20 rule (Hajji and Doli, 2016, p. 138).

The Pareto chart is a bar graph typically used to illustrate the relative importance of the problems under study or their causes, with the aim of selecting a starting point for solving the problem in the organization in question.

3-1-2 How to Draw a Pareto Chart

The Pareto chart is plotted by following these steps: (Jablaq, 2021, p. 161)

- ✓ Classification of the causes of the problem under study ;
- ✓ Calculate the number of errors or defects and distribute them across the classifications of causes of the problem ;
- ✓ Determine the percentages of defects or errors;
- ✓ Ranking the causes in descending order according to their percentages ;
- ✓ Draw a horizontal axis representing the causes and a vertical axis representing the defects or errors and their cumulative percentages on the corresponding axis ;
- ✓ Draw a column or bar for each cause category, then arrange them from highest to lowest frequency, starting from the center and moving to the right ;
- ✓ Plot points at the midpoint of each column, then connect these points to one another, so that the contribution of each cause can be determined individually.

Thus, it can be said that the Pareto chart is nothing more than a graph in the form of a frequency histogram consisting of a set of columns, where the length of each column is proportional to the frequency corresponding to it and to the error in question, with these columns arranged in descending order.

3-2 Ishikawa Diagram.

3-2-1 Definition of the Ishikawa Diagram

It is called the Ishikawa diagram, the cause-and-effect diagram, or the fishbone diagram. It is named after the Japanese statistical quality expert "Kazuo Ishikawa," who is credited with developing this diagram in the 1960s.The Ishikawa diagram serves as a tool for identifying and organizing the causes of a specific problem or incident within an organization. It presents the relationship between causes and their relative importance in a diagrammatic form resembling a fish skeleton (Masoudi and Tawiti, 2023, p. 56).

3-2-2 How to Draw an Ishikawa Diagram

To draw an Ishikawa diagram, we follow the following steps. (Jablaq, 2021, p. 167)

- ✓ Identify the main problem or effect, which is the head of the fish (dependent variable);
- ✓ Draw a central line and its branches, and place the main causes on them (independent variables) ;
- ✓ Draw the secondary branches branching off from the main branches of the previous centerline ;
- ✓ Place the secondary causes on them, which ultimately form the skeleton of the fish ;

The previous causes were named the 5Ms because they begin with the letter M, which refers to:

-the workers ;

-Raw materials ;

-Equipment ;

-production methods ;

-Measurements.

After completing the Ishikawa diagram, the causes are subjected to further analysis by applying the following rule: (Masoudi and Tawiti, 2023, p. 57)

5WH = Who, Why, When, Where, What, and How

Second : The applied study of the Japanese Kaizen strategy in the continuous improvement of the production process at the Boumaiza Food Industries Complex in Skikda

The applied aspect of this study focused on the loss of the raw material—tomatoes—during the production process at the complex during the second week of July 2024. This problem was then analyzed using the Pareto chart and the Ishikawa diagram. Information related to the study's problem was collected as follows.

2-1 Analysis of Tomato Loss Quantities at the Food Industry Complex

The following data represent the rate of tomato loss from the initial receipt of raw materials from producers through to the sale to customers, as shown in the table below

Table 01 : Amount of Lost Tomatoes **Unit: 1 kg**

Loss by days	Day 1 07/13/ 2024	Day 2 07/14/20 24	Day 3 July 15, 2024	Day 4 July 16, 2024	Day 5 July 17, 2024	Day 6 July 18, 2024	Loss rate
Unloading the tomatoes into the washing tank	**108**	**122**	**140**	**156**	**118**	**268**	**152**
Tomato Sorting on a Conveyor Belt	**80**	**100**	**140**	**120**	**60**	**75**	**95.83**
tomato Cans are perforated during sealing	**22**	**36**	**14**	**10**	**30**	**45**	**24.50**
Cans of tomatoes with perforated bottoms	**00**	**32**	**00**	**15**	**12**	**31**	**15.00**
Cans of tomatoes with holes in the lids	**20**	**48**	**60**	**65**	**14**	**80**	**47.84**
Cans of tomatoes before delivery to customers	**15**	**10**	**10**	**20**	**8**	**12**	**11.5**
Boxes stored in the institution's warehouse	**05**	**05**	**8**	**17**	**14**	**15**	**10.66**
Cans returned by customers	**00**	**10**	**12**	**15**	**03**	**15**	**09.16**
Total	**250**	**363**	**384**	**418**	**259**	**541**	**366.48**

Source : Prepared by the researchers based on data from the Production and Quality Control Department

As shown in Table No. 01, we have identified a significant loss of tomatoes at the facility, totalling 366.48 kg. This is a negative indicator for the institution, and this is without accounting for the direct and indirect costs per kilogram. The amount of loss during unloading for washing alone was 152 kg, followed by the tomato sorting process, which accounted for 95.83 kg. Meanwhile, the lowest amount of loss was 9.16 kg, which was recorded as the quantity returned by customers due to non-compliance with specifications.

2-2 Analysis of the tomato loss rate using a Pareto chart

As shown in Table 01, the cases of loss for raw materials will be ranked according to their loss rate, so that the category with the highest loss rate and the category with the lowest loss rate can be identified. The process is carried out by arranging the loss rates for each case in descending order, as demonstrated in the following table :

Table No. 02 : Descending order of tomato loss rates and loss percentages at the Food Industries Complex in Boumaiza – Skikda –

Loss Category	Amount of Loss	Loss Percentage	Cumulative Percentage	Rank	Classification
Unloading the tomatoes into the washing tank	**152**	**41.47**	**41.47**	**01**	The factors affecting the loss of raw material
Tomato Sorting on a Conveyor Belt	**95.83**	**26.15**	**67.62**	**02**	
tomato Cans are perforated during sealing	**47.84**	**13.20**	**80.82**	**03**	
Tomato cans with punctured lids	**24.49**	**06.68**	**87.5**	**04**	The excess that does not affect the loss of raw material
Cans of tomatoes with punctured bottom lids	**15.00**	**04.13**	**91.63**	**05**	
Tomato cans before delivery to customers	**11.50**	**03.14**	**94.77**	**06**	
Cans stored in the company warehouse	**10.66**	**02.91**	**97.68**	**07**	
Cans returned by customers	**09.16**	**02.49**	**100**	**08**	
Total	**366.48**	**100**		**08**	

Source : Prepared by the researchers based on data from Table 1

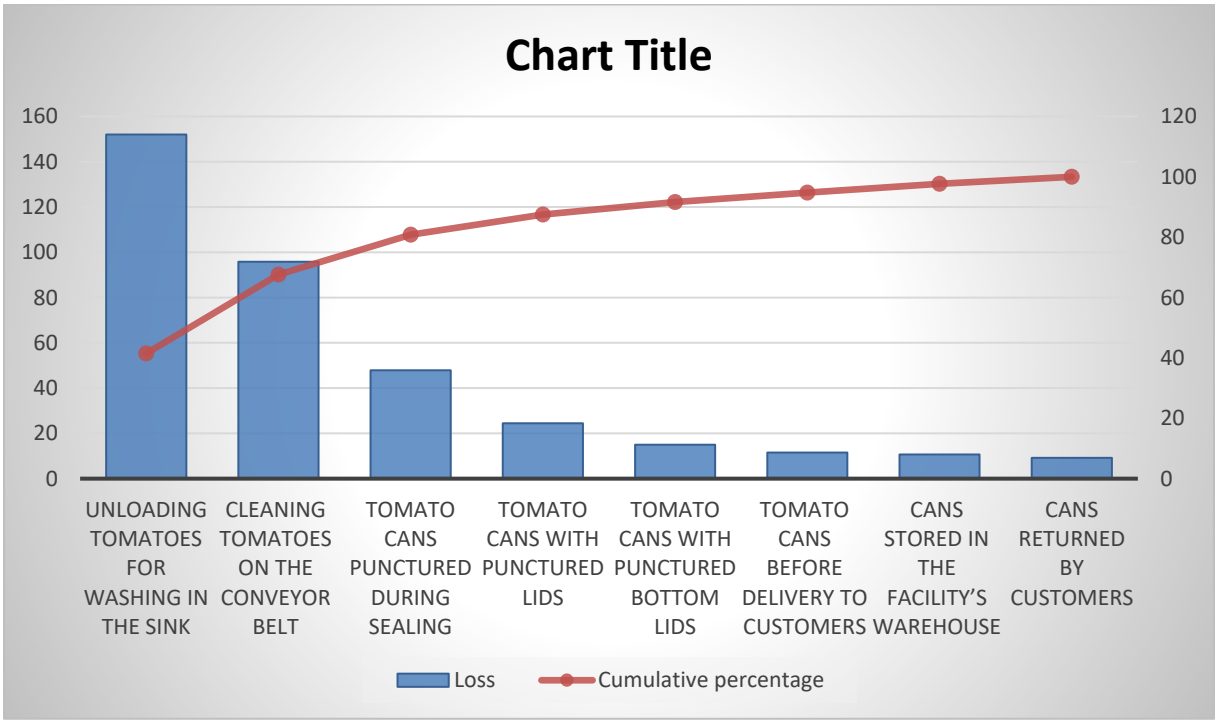
As shown in Table No. 2 (loss rates for raw materials, tomatoes), it appears that the greatest loss of material (152 kg) occurs during the unloading and washing process in the designated basin. This represents 41.47% of the overall loss rate. It is followed by the tomato purification stage on the conveyor belt (95.83 kg), which represents 26.15% of the total loss rate. The lowest rate of loss was recorded for cans returned by customers, with a total loss of 9.16 kg, representing 2.91% of the total material loss rate. All of the aforementioned occurred during a six-day inspection period in July 2024 at the plant.

Based on the table above, cases of raw material loss were classified into two groups as follows

- **Group 1** : contains cases involving the highest loss of raw materials. This group includes three cases : unloading tomatoes for washing in the sink, cleaning tomatoes on the conveyor belt, and sealing tomato cans with punctured lids.
- **Group 2** : It includes the cases with the lowest raw material loss. The cases covered are as follows : tomato cans with punctured top lids, tomato cans with punctured bottom lids, tomato cans prior to delivery to customers, cans stored in the facility's warehouse, and cans returned by customers.

  Figure 2 is a graphical representation of the Pareto chart based on the data in Table 2.

Figure 02 : Graphical representation of the Pareto chart for tomato loss



Source: Created using Excel based on Table 02

As illustrated in Figure 2 of the Pareto chart, the three primary cases contributing to the loss of raw materials (namely, tomatoes) account for 37.5% of the total eight cases analysed. These cases are: unloading the tomatoes for washing in the basin, cleaning the tomatoes on the conveyor belt, and punctured tomato cans during sealing.Collectively, these three cases account for 80.82% of the total raw material loss at the plant level. The remaining cases account for 62.5% of the total, and include tomato cans with punctured lids, tomato cans with punctured bottoms, tomato cans prior to delivery to customers, cans stored in the company's warehouse, and cans returned by customers. Collectively, these cases accounted for 19.18% of total raw material (tomato) losses at the plant level, thus aligning with the Pareto 80/20 principle. Therefore, it is necessary to identify the causes behind the impact of these three cases compared to the rest – i.e. the few versus the many – using an Ishikawa diagram or cause-and-effect diagram.

2-3 Analysis of the three most influential causes according to the Ishikawa diagram

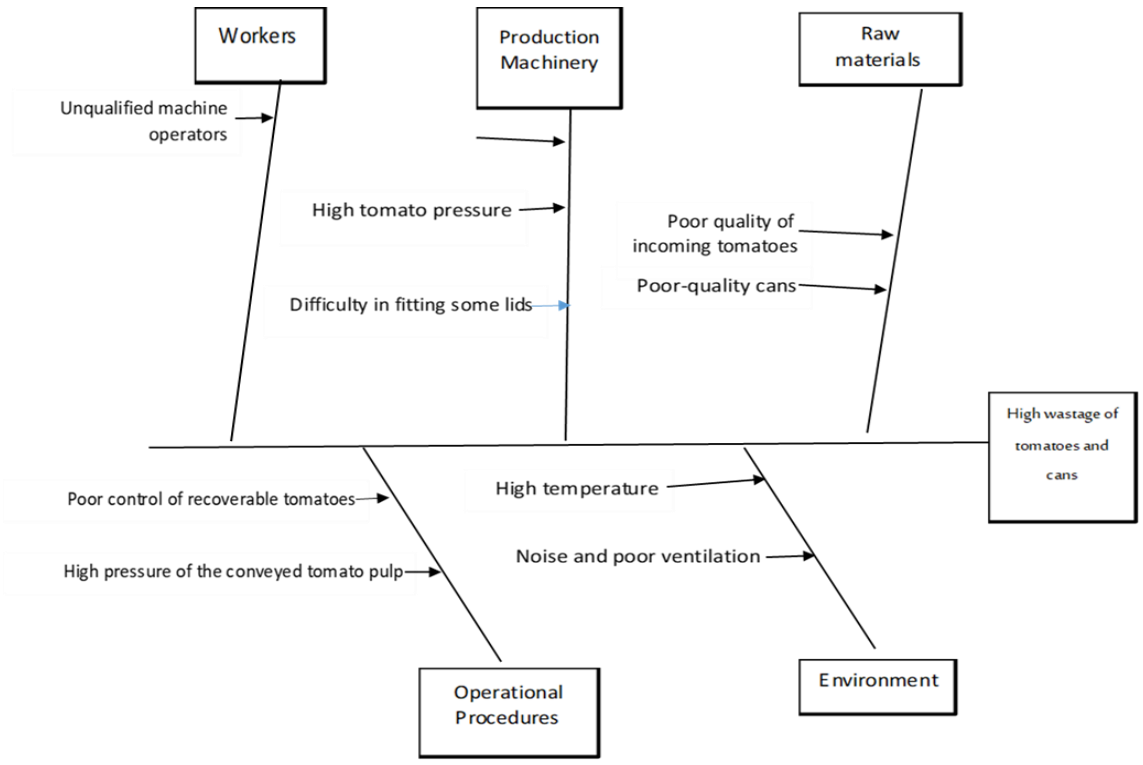
The figure shows that there are three cases with a significant impact on raw material loss at the facility level, which necessitates identifying the causes behind this increase in the loss rate—a point that was tracked and observed during the applied study. Among the cases examined that played a major role in increasing the loss rate are the following :

- **Raw Material** : The raw material consists of fresh tomatoes supplied by farmers, and its quality is affected by temperature and the limited capacity of the washing tank.

- **Production machinery** : The conveyor belt is of a certain age and is subject to frequent stoppages. The machine sealing the top lid is also subject to repeated stoppages.
- **Labor :** During the tomato harvesting and processing period, the facility employs only unqualified and seasonal workers for unloading the raw material, as well as unqualified workers on the sorting conveyor belt and some unqualified workers operating the horizontal can sealing machine
- **Environment :** High temperatures inside the production lines, machine noise, and high summer temperatures, which affect product safety
- **Processes :** High storage volumes and insufficient warehouse space, forcing the facility to place excess quantities outside the warehouse perimeter ; stoppages in some production processes, leading to the accumulation of tomato cans on the production lines, cans falling to the ground, and scratches on some cans
- **Methods employed :** Failure to inspect the quantity of fresh tomatoes received prior to unloading ; failure to inspect empty tomato cans prior to filling

Figure 3, which represents a fishbone diagram, summarizes the main causes of high raw material loss at the plant level.

Figure 03: Ishikawa diagram analyzing excessive tomato losses at the complex



Source: Prepared by the researchers based on the results of the Pareto analysis

Study Results:

The applied study, based on Table 2 (which presents data from the Pareto chart showing the descending order of loss rates for the raw material [tomatoes] at the plant level and the percentages of these losses) and Figure 2 (which represents the Pareto chart containing the most significant occurrences of factors contributing to loss at the plant level, along with their combined occurrences), as well as Figure 3 (which represents the fishbone diagram showing the most significant factors contributing to high loss rates of tomatoes — which we consider to be the primary factors having a major impact on increasing loss rates) and based on the Pareto and Ishikawa models, the following results were obtained:

- ✓ There are 8 cases of raw material loss, which differ in their loss rates. Among these, 3 cases of raw material loss constitute or have a significant impact on raw material loss, accounting for 80.82% of the total lost quantity.
- ✓ There are 5 cases of loss with a minor impact, accounting for 19.18% of the total lost quantity.
- ✓ According to the Pareto analysis, 47.84% of all cases account for 80.82% of the loss of the primary material (tomatoes) at the facility level. This aligns with the 80/20 rule, also known as the Pareto principle. The Pareto principle indicates that 80% of results are due to 20% of the causes of the problem.
- ✓ Significant waste and loss of raw material at the washing tank
- ✓ Downtime affecting the conveyor belt and increased loss of raw material during purification.
- ✓ Lack of regular follow-up on maintenance, particularly regarding spare parts for certaines machines.
- ✓ Acceptance of the hypothesis that the Japanese Kaizen strategy contributes to the continuous improvement of the production process at the Boumaiza Food Industries Complex in Skikda
- ✓ Poor ventilation in production workshops, high machine noise levels, and inadequate ventilation in the facility's warehouse, which cannot accommodate large production volumes.

In light of the findings outlined above, we are pleased to put forward the following recommendations to enhance the Kaizen methodology at the complex:

- ✓ Expansion of the washing tank for tomato products to accommodate larger quantities and reduce waiting lines.
- ✓ Equipping the facility with an additional conveyor belt.
- ✓ Recycling of production waste.
- ✓ Employment of experienced workers alongside seasonal workers to reduce certain defects.
- ✓ Monitoring of the product during weighing and receipt from farmers, and establishment of a specific weight allowance for fresh tomatoes that do not meet specifications.

- ✓ Packaging of tomatoes during peak production in plastic or metal barrels of a specific capacity to speed up unloading and reduce waiting time for farmers, thereby preserving the integrity of the raw material.

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