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INTRODUCTION

This document will discuss some crucial operational aspect to the National Agricultural Development Company (NADEC) <https://nadec.com.sa/> dairy Milk production company such as how well the inventories within the production system are currently managed, detailed illustration of the critical operations involved within NADEC production system presenting a logical operational flow, identify the two points where the organisation's delivery system may fail to align its operational performance measures, how a lean approach could be utilised in the production system to reduce the failings potentially and the three key findings discussing the extent to which the lean approach may assist the production system with aligning its operational performance measures

THE INVENTORIES WITHIN THE PRODUCTION SYSTEM

NADEC uses the latest technology to keep pace with the rules of inventory control, demand, forecast and reordering, to provide the requirements of customers promptly and the right place through the system ORACLE (ERP, WMS and MRP)

It is an impartial system that gives the authority to all interested stakeholders to access inventory records related to the activity they are engaged in and linked to the stock and demand for it to achieve the desired goal of reducing loss and manipulation

NADEC consider its inventory is the cornerstone of all the assets it owns as it is the primary component of the initial products, under process and the finish products ready for delivery to customers

- **Raw materials items:** are being used by the plant in the production. Consist of raw milk, which kept in silos for 36 hours only to avoid losing product quality or working against HACCP and food safety standards.
Materials purchased for manufacturing and production to cover the requirements of the market and future customers
- **Work-in-progress (partially manufactured)** items that are currently in the production process. The unpacked goods and packing materials are considered WIP; used to store condensed milk is in dedicated Bins and butter is stored in tubs. Products that still need some more work to classify it under finished product.
- **Finished outputs or goods:** The materials which have already been produced but are still not sold. They store it in a mega warehouse close to plant in HARAD Farm.

NADEC METHODOLOGY:

- 1- Set by the inventory policy established by management. The production manager depends on providing the most significant quantity of all the raw materials used in the production to ensure smooth production process without affecting or stopping. The opposite relationship between the marketing manager and the financial manager, the marketing manager wants to have a full stock of the finished product, in contrast to the business manager who wants to save all expenses to the maximum extent and if there must be a large number of finished products, we have to provide a strong justification of that step
- 2- Integrate inventory within the everyday functions within the company. All asset-related transactions will be governed by order of purchase, exchange, or depreciation through the system. The system will be the user's guide through the main inventory screen. It will not

allow the reduction of the assets unless there are approvals that specify that the primary surplus of the company and subsequently will not allow the purchase of an asset unless there are approvals to approve the purchase and the existence of the budget that will enable it.

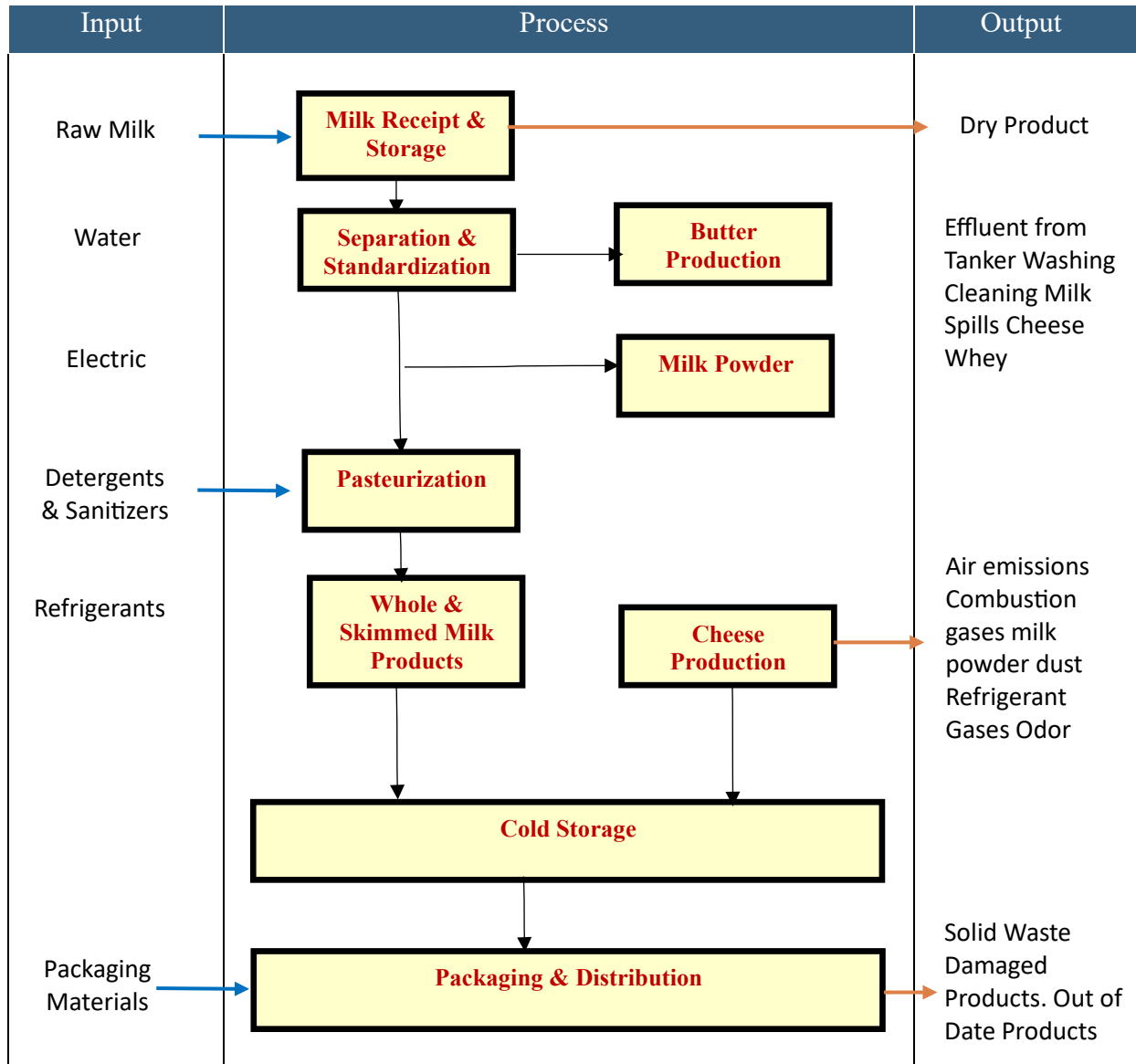
- 3- Continuous Review System, NADEC has carried out the control of the inventory through the pushing of the warehouse supervisor and inventory staff to drop a periodical visit to the storage locations in the warehouse and the work of a physical cycle count of the storage places and the reconciliation between perpetual and physical stock and not to open the door to any differences in the inventory resulting from spontaneous mistakes or loss or manipulation
- 4- Ensuring inventory control to provide all the requirements at the right time and place by:
 - **Purchase control.**
 - Purchase Price:-** Provide three quotations per purchase, compare all quotes (comparative statement), taking into consideration product quality and standard payment terms
 - Purchase quality & quantity.** It is taking into consideration that the materials to be purchased to cover the consumption of 6: 12 months, which means that the amount of economic order for different types of materials is not determined
 - Purchase time.** Or Lead Time agreed with suppliers and adjusted on the MRP system to not contradictory with the production process.
 - **Storage control.** control over perpetual inventory
 - **Warehouse Accounting.** Which includes the implementation of policies and procedures that govern the power of all activities of the warehouse from the receipt, inspection and monitoring, storage, distribution. Etc. and linking them to the Oracle system to ensure the efficiency of the rules of control over the stock and re-demand/re-order it
 - **Forecasting** in Nadec adopted a stock forecasting policy that relates both strategic planning to operational planning and financial planning, taking into account that both the mathematical model, the historical data available and the qualitative methods are based on management experience, taking into account the annual demand for the desired goods to purchase as a mix of experience between planning management Sales, monthly meetings of both departments and historical data available.

KEY OPERATIONS INVOLVED WITHIN NADEC PRODUCTION SYSTEM

Production Division Departments QA, Brands and Packaging.

Milk Collection Departments Agriculture, and Logistics Departments.

PRODUCTION PROCESS



- 1- **Collection & Reception** - The milk collection is carried out in tanks, then transferred to the milk production plant where they are required to be used in the production process, taking into account that the usual tests must be applied during collection,
- 2- **Storage** – as per international agreed standards in Silos (dedicated tanks).
- 3- **Standardisation** - or thermization life of milk which's mean giving milk 72 °C temperature for 15 seconds to reduce bacteria
- 4- **De-Creaming** - To remove the cream from the liquid and transfer it to the butter section the milk is given both temperature of 60 ° C and 60,000 RPM
- 5- **Pasteurisation** - To complete the removal process, milk is heated at 92 ° C temperature for 5 seconds.

- 6- **Evaporation** – It is known that the milk starts boiling from 70 degrees Celsius, so it is necessary to heat the milk pressure of 889 millibars, and milk is affected by four stages of steaming different initial 56% and 62%, 67% third and 75%
- 7- **Spray Drying** - By pressing five high-pressure nozzles by throwing 320 degrees of warm air on the milk
- 8- **Cooling** - powder is cooled before storing, Powder stored in bins.
- 9- **Packing** – as per production plan Milk will be packed in different packing according to the required weight

ORGANISATION’S DELIVERY SYSTEM MAY FAIL TO ALIGN ITS OPERATIONAL PERFORMANCE MEASURES

MISHANDLING TEMPERATURE AND STORAGE CONDITION

- 1- When not following food safety and HACCP conditions in utilise clean approved tanks, Soils and equipment;
- 2- Not maintaining stainless-steel soils and tanks (easy cleaning and opening)
- 3- Neither shade nor cover collected liquid milk
- 4- Delaying in Transport liquid milk as after milking.
- 5- The milk must be collected in a clean place.
- 6- cleaning the Failing from dirt and any residues of milk
- 7- Not comply with Temp. Conditions and standards as following:

Temp.	Condition and Purpose
8 ° C	Guarantee product quality, if the milk not collected within two hours of milking
< 8° C	If it is collected daily
< 6°C	If it is not collected daily
not exceed 10°C	transferred from the MCC to a dairy processing facility
No Cooling	Milk can be transferred to the processing facility within 2 hours after milking
below 40 °F	protect the milk’s quality

- 8- Failing in the disinfection process will allow the most harmful bacteria.
- 9- Leave cream at room temperature, and mix between warm cream and refrigerated one — failed in Use fresh, pasteurised cream within one to five days of the “sell-by” date.
- 10- Type of spoilage called rancidity when not storage butter properly.
- 11- In case wrong storage to butter allowing absorbing odours from other foods rapidly.
- 12- Not following standards in butter storage such keep butter wrapped in moisture- and vapour-proof material or in tightly covered containers.

- 13- Keeping Yogurt covered in the refrigerator more than seven to 10 days past the “sell-by” date

MISHANDLING WASTEWATER (NOT RECYCLING)

- 1- Discharge wastewater to land:
 - Will affects soil structure.
 - The negative impact on underlying groundwater and affect its quality.
 - The opportunity of adverse effect on vegetation comes from a high salt level.
 - Discharge wastewater to sewage will cause Odours.

LEAN APPROACH COULD BE UTILISED IN THE PRODUCTION SYSTEM TO POTENTIALLY REDUCE THE FAILINGS

LEAN PRODUCTION one of the most important steps to increase productivity and reduce waste and recommended in dairy factories, which focuses on. Improve performance by adding value, creating flow, eliminating waste and reducing contrast

LEAN PRINCIPLES

- 1- Identifying Value Streams by measuring the performance for all available process and production, to define the amount we need to ask ourselves some questions such a timeline for manufacturing and delivery? What are the other essential points that must consider? What is the price point?
- 2- Define the root cause for each underperformance.
- 3- Identify each process and the link between it and performance. This will reflect by 50% more in productivity and efficiency as here we will be sure that after removing waste from the cycle the rest of steps going smoothly without any blockage or issues affecting the cycle
- 4- Guarantee to achieve high performance by standardising the process. Avoiding build stock in advance or carry the cost of storage, vice versa will save money in production and storage, giving the required product to the customer upon requestion.
- 5- Maintain the continues improvement by monitoring performance, define accountability and sustain the lean operation. As the process is not lean without been through the value stream mapping involving every employee on it.

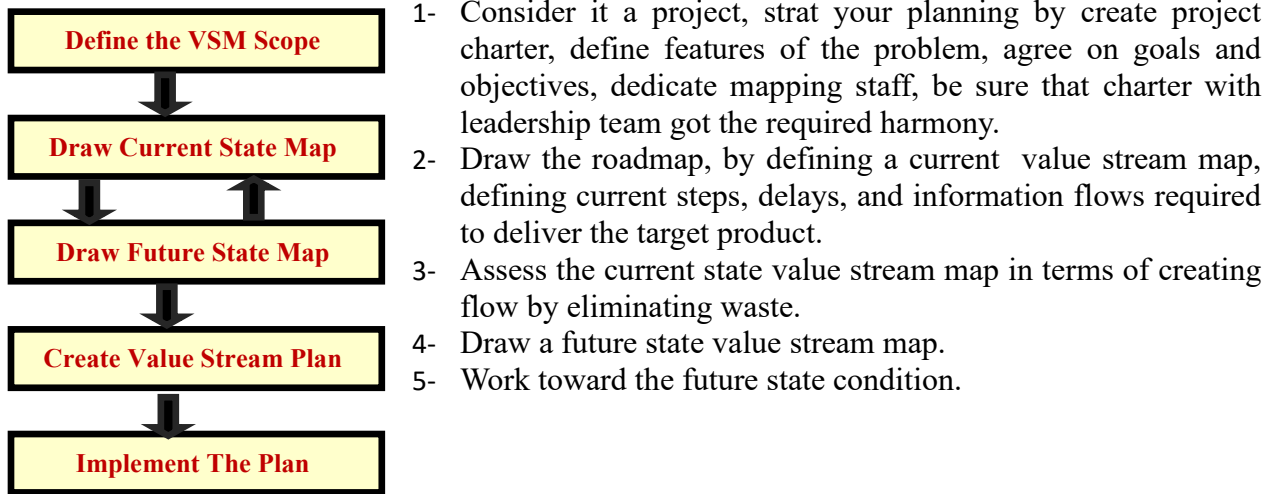
LEAN TOOLS

5S: Building understanding between employees to organise the work environment and know how they should work to increase productivity and efficiency

- Sort
- Set in Place
- Shine
- Standardise
- Sustain

Automation: targeting do not have any defective products and reduce any overproduction, depend on detecting anything up-normal, stop the operation, fix the issue immediately, investigating the root cause and fix preventive action not to repeat again

VSM – VALUE STREAM MAPPING



The dairy & juice industry has made a lot of efforts to provide the production requirements promptly by:

- Process the sorting, processing and storage of finished products to the final stage of delivery of the product to the distributors.
- Follow up and ensure the provision of sufficient transport fleet to cover the distribution and transport requirements to meet the needs of the end customer

VSM IS:

The tool used to put us on solid ground to explain to us the comprehensive analysis of the full scene, describing”

- Where the waste and loss occurs.
- Help us to draw plans to eliminate unnecessary practices in the stages of collection and storage.

In detail and explained, more will be:

Used to reduce the errors that occur now and especially in the area of receipt of goods received to the warehouse and Kiva and a number of terms of compliance with the standards and conditions of receipt agreed upon and the implementation of the process of numerical review and ensure that dealing with them in the manner recognized in line with the standards Requirement

Changing VSM that will allow:

Monitoring all activities and practices, moreover will discover all the problems and waste that we can avoid in the process of collection and storage.

LEAN MANUFACTURING:

Will guide management to do:

- The inside production line will develop production and leadership plan, which include production managers and team leaders.
- Maintain the responsibility in the farms to all staff responsible for milking, fertility or feed management and giving them the opportunity to [articipate in production planning and budgeting process.
- Identify professional and fruitful daily, weekly, monthly and annual KPIs for the production team and management
- Eliminate waste.
- Doing things better in half of the resources as mass production requires.
- Providing higher quality with lesser cost.
- Lean principles and practices as are necessary for successful implementation of lean as lean practices without knowing lean principles can give short term success but may fail as long term strategy it presents the review of barriers of lean implementation from the literature review.

THREE KEY FINDINGS DISCUSSING THE EXTENT TO WHICH THE LEAN APPROACH CHOSEN MAY ASSIST THE PRODUCTION SYSTEM WITH ALIGNING ITS OPERATIONAL PERFORMANCE MEASURES

VSM It is a professional and non-profit tool whose main objective is to:

- Detecting problems
- Suggest appropriate solutions
- Redesign and change the root cause of the problem
- Improving performance and quality
- Reduce time, cost and eliminate waste

EFFECTIVE COMMUNICATION.

Value stream mapping depending on the material and information flow to success as the design of best communication way to information flow will lead to a communicate the business process and performance with the best way that can everyone understand it and achieve it.

PRODUCT FLOW

- From the concept of delivery, this step can maps steps of the development lifecycle
- Also showing both tasks performed and the person whose perfume it.

TIME LADDER (VALUE STREAM TIMELINE)

Containing two parts:

- **Upper portion**
The average time that product has to wait in each stage in the process
- **Lower portion**
The average time when value added to the product during a specific phase.

CONCLUSION

In this document, we analysed NADEC's manufacturing production system, which passes through a critical assessment of the extent to which stocks and assets are currently managed within NADEC. We have identified two points where the organisation's delivery system may fail to harmonise its operational performance metrics, which clearly illustrates the logic and understanding behind it.

We used a simple approach to the production system to reduce the shortcomings discussed.

We have identified three primary outcomes that discuss how the lean approach chosen can help the production system by aligning operational performance metrics.

REF.

- Bartlett, M.S., 1964. On the Theoretical Specification of Sampling Properties of Auto-Correlated Time Series. *J. Roy. Stat. Soc. B8*: 27-41.
- Burki, A. A. Khan, M.A. and Faisal, B. 2004. The state of Pakistan's dairy sector: An Assessment: *The Pakistan Develop. Rev* 43 (2): 149–174.
- Box, G.E.P. and Jenkins, G.M. 1970. *Time Series Analysis: Forecasting and Control*. Holden-Day, San Francisco. California, USA.
- Box, G. E. P. and Pierce, D. A. 1970. Distribution of residual autocorrelations in autoregressive-integrated moving average time series models. *J. Am. Stat. Assoc.* 65:1509-1526.
- Brown, R.G.1959. *Statistical Forecasting for Inventory Control*. New York, McGraw-Hill.
- GOP, 2011. *Economic Survey of Pakistan (2010-2011)*, Government of Pakistan, Economic Adviser's Wing, Finance Division, Islamabad.
- Holt, C.C. Modigliani, F. Muth, J.F. and Simon, H. A. 1960. *Planning, Production, Inventories and Work Force*. Prentice-Hall, Englewood Cliffs, NJ, USA.
- Abdulmalek, F. A. & Rajgopal, J. (2007). Analyzing the benefits of lean manufacturing and value stream mapping via simulation: a process sector case study. *International Journal of production economics*, 107(1), 223-236.
- Hines, P. & Rich, N. (1997). The seven value stream mapping tools. *International journal of operations & production management*, 17(1), 46-64.