



Lean Management in SPA

Area 4 – Entrepreneurship in Farming
Lesson 11 – Entrepreneurship in SPA
Sequence ID – 45

UNIFI





UNIVERSITÀ
DEGLI STUDI
FIRENZE

DAGRI
DIPARTIMENTO DI SCIENZE
E TECNOLOGIE AGRARIE,
ALIMENTARI, AMBIENTALI E FORESTALI

Prof. Marco Vieri
Full Professor
marco.vieri@unifi.it



Daniele Sarri
Researcher
daniele.sarri@unifi.it



Stefania Lombardo
Research Fellow
stefania.lombardo@unifi.it



Valentina De Pascale
Research Fellow
valentina.depascale@unifi.it



Riccardo Lisci
Technical Researcher
riccardo.lisci@unifi.it



Marco Rimediotti
Research Fellow
marco.rimediotti@unifi.it



Carolina Perna
Research Fellow
carolina.perna@unifi.it



Andrea Pagliai
Doctoral Student
andrea.pagliai@unifi.it



Eleonora Salvini
Research Fellow
eleonora.salvini@unifi.it





DISCLAIMER

A4.L11.T3 Lean Management in SPA

Marco Vieri, marco.vieri@unifi.it, University of Florence, Italy, [0000-0002-6167-5322](tel:0000-0002-6167-5322)

Daniele Sarri, daniele.sarri@unifi.it, University of Florence, Italy

Stefania Lombardo, stefania.lombardo@unifi.it, University of Florence, Italy

Marco Rimediotti, marco.rimediotti@unifi.it, University of Florence, Italy

Riccardo Lisci, riccardo.lisci@unifi.it, University of Florence, Italy

Valentina De Pascale, valentina.depascale@unifi.it, University of Florence, Italy

Eleonora Salvini, eleonora.salvini@unifi.it, University of Florence, Italy

Carolina Perna, carolina.perna@unifi.it, University of Florence, Italy

Andrea Pagliai, andrea.pagliai@unifi.it, University of Florence, Italy

Marco Vieri, Daniele Sarri, Stefania Lombardo, Marco Rimediotti, Riccardo Lisci, Valentina De Pascale, Eleonora Salvini, Carolina Perna, Andrea Pagliai, *Lean Management in SPA*, © 2020 Author(s), [CC BY-SA 4.0 International](https://creativecommons.org/licenses/by-sa/4.0/), [DOI 10.36253/978-88-5518-044-3.46](https://doi.org/10.36253/978-88-5518-044-3.46), in Marco Vieri (edited by), *SPARKLE - Entrepreneurship for Sustainable Precision Agriculture*, © 2020 Author(s), [content CC BY-SA 4.0 International](https://creativecommons.org/licenses/by-sa/4.0/), [metadata CCO 1.0 Universal](https://creativecommons.org/licenses/by-sa/4.0/), published by [Firenze University Press](https://www.firenzeuniversitypress.it/), ISSN 2704-6095 (online), eISBN 978-88-5518-042-9, [DOI 10.36253/978-88-5518-044-3](https://doi.org/10.36253/978-88-5518-044-3)

Table of Contents



1. What is lean production?
2. The evolution of lean production
3. The 5 principles
4. Waste in farming
5. Lean management approach in farming
6. Lean farming



Overview



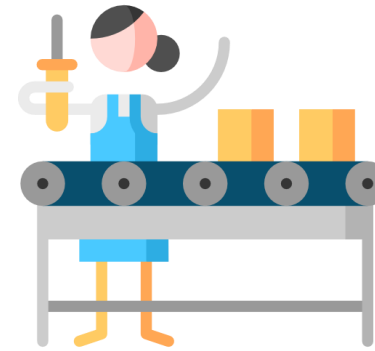
Lean “slim” is a management method that increases efficiency of the process analysing sequence, times, and infrastructures to create more value with less work. Pillars of Lean production are multiple optimizing actions: 5S (Sort, Set-up, Shine, Standardise, Sustain) , Seven Waste Identification, Value Stream Mapping, Total Productive Maintenance, Error proofing, Fast Changeovers, CI Blitz.

Born in Toyota following the evolution of Scientific Method of Management, Taylorism and Total Quality is the actual efficiently method in the productive process. It is a new born method in farming but already used in agro-industry process like winery. It is a participative, continuous improvement action that is based on human involvement and structural optimization.



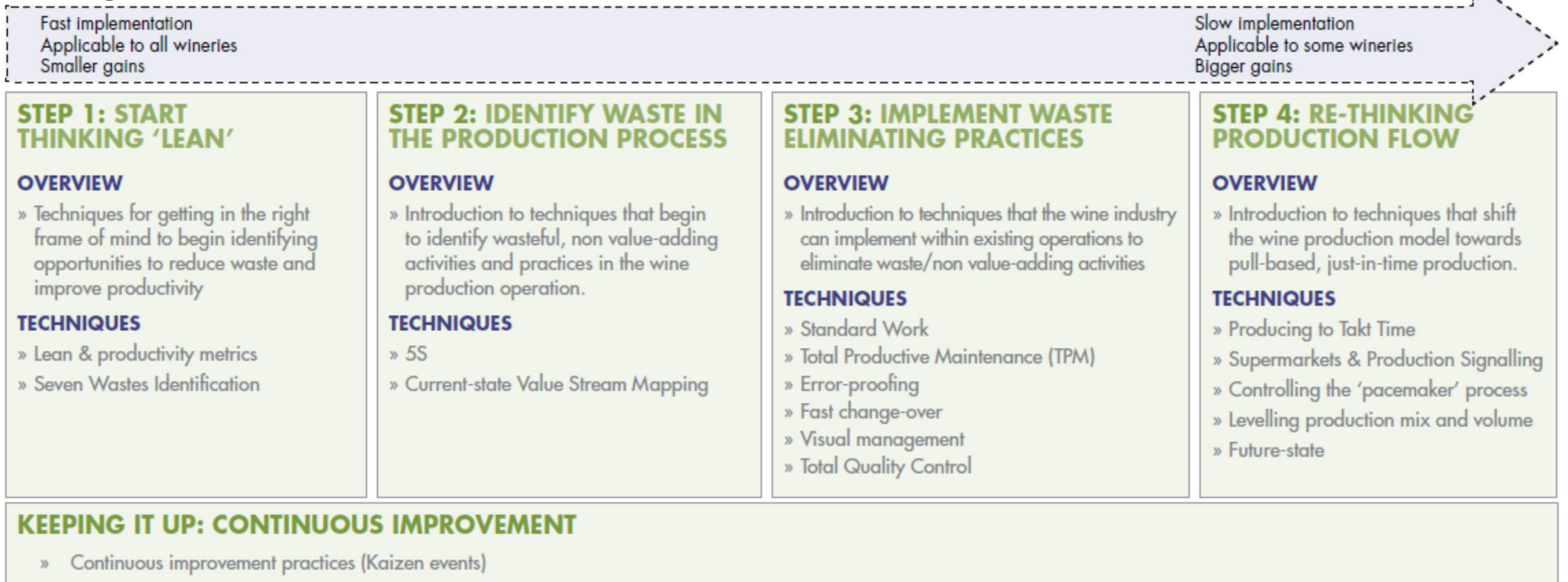
1. What is lean production?

(1/2)



Lean production is:

- Rational process of production (control, monitoring, assembly line)
- Minimizing waste



1. What is lean production?

(2/2)

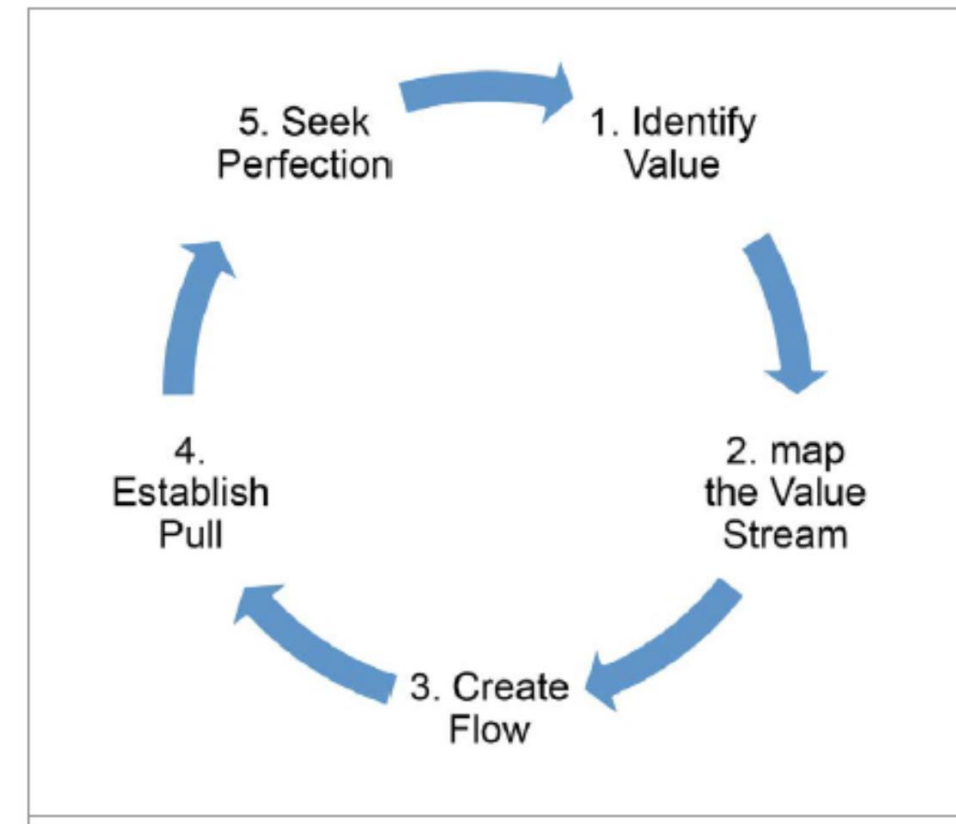


DEFINING LEAN PRODUCTION

Lean production is a system of tools and practices for improving operations, suppliers and customers relations such that the business requires:

- Less human effort
- Less space
- Less capital
- Less material
- Less time to make products with fewer defects to precise customer desires

GUIDING PRINCIPLES OF LEAN



2. The evolution of lean production

from Frederick Winslow Taylor



Frederick Winslow Taylor

March 20, 1856 – March 21, 1915

He wrote [*The Principles of Scientific Management*](#), a book in which he includes all his studying about efficiency in work processes and manufacturing.

“The principles of assembly are these”:

Place the tools and the men in the sequence of the operation so that each component part shall travel the least possible distance while in the process of finishing.

- Use work slides or some other form of carrier so that when a workman completes his operation, he drops the part always in the same place—which place must always be the most convenient place to his hand—and if possible have gravity carry the part to the next workman for his own.
- Use sliding assembling lines by which the parts to be assembled are delivered at convenient distances.

3. Thinking Lean

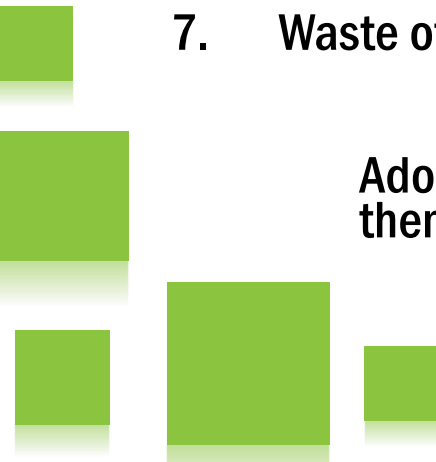
measure, identify, set in order, and eliminate waste



Lean production does this through addressing seven key types of waste in a winery operation:

1. Waste of overproduction
2. Waste of waiting
3. Waste of transportation (Conveyance)
4. Waste of over-processing
5. Waste of inventory
6. Waste of Motion
7. Waste of Correction (Defects)

Adopting the right mind-set for Lean means understanding these wastes and getting better at seeing them



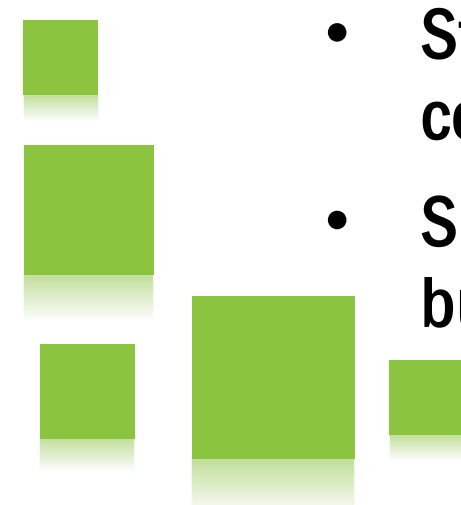
3. Thinking Lean

measure, identify, set in order, and eliminate waste



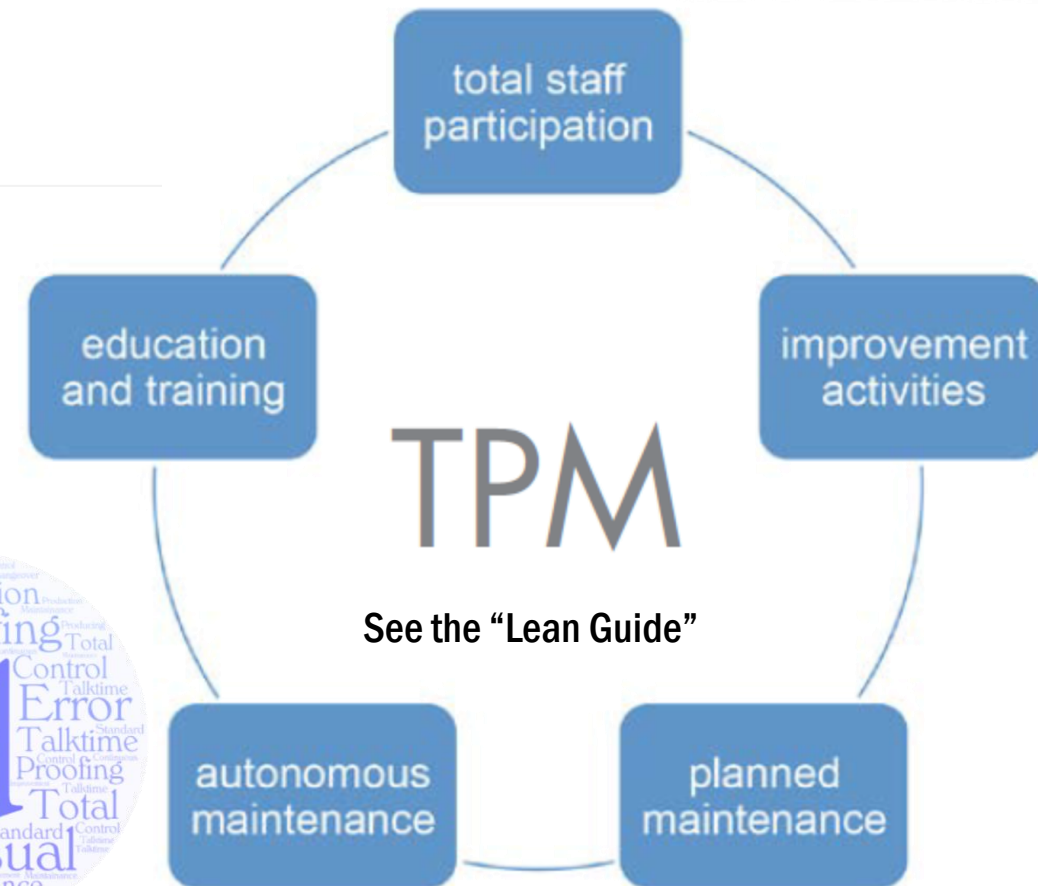
Key steps of 5S

- Sort and eliminate items that are not needed
- Straighten and organise all items that remain
- Sweep and ensure the workplace is organised
- Standardise to ensure that waste and inefficiencies are easily and consistently recognised
- Sustain the previous four steps and make 5s a way of life in the business.



4. Lean Production Techniques

- Standard Work Assessment
- Total Production Maintenance TPM
- Producing Talk Time
- Error Proofing & Fast Changeover
- Visual Management
- Quality Control
- Continuous Improvement



References:

- https://www.wineaustralia.com/getmedia/b6b63b37-bde7-49ac-9e7f-b6a8d0fd44e2/2014_The-lean-guide.pdf

Design Thinking

Continuous Improvement



1. Examine the process
2. Identify improvement opportunities
3. Implement the changes.



1. Training
2. Examining
3. Analysing
4. Implementing
5. Checking and celebrating the change

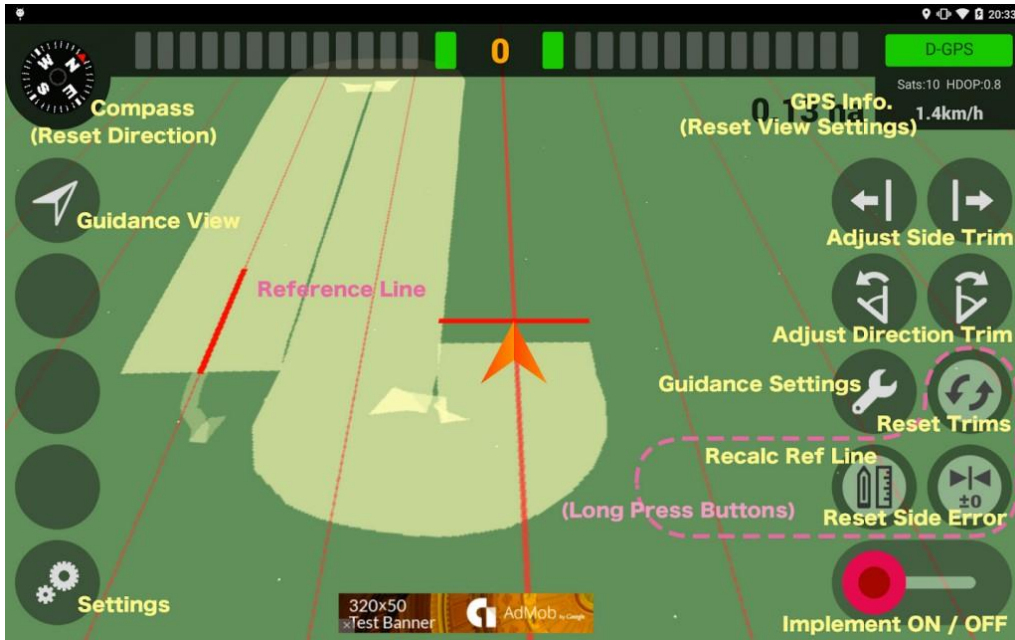


TOOLS

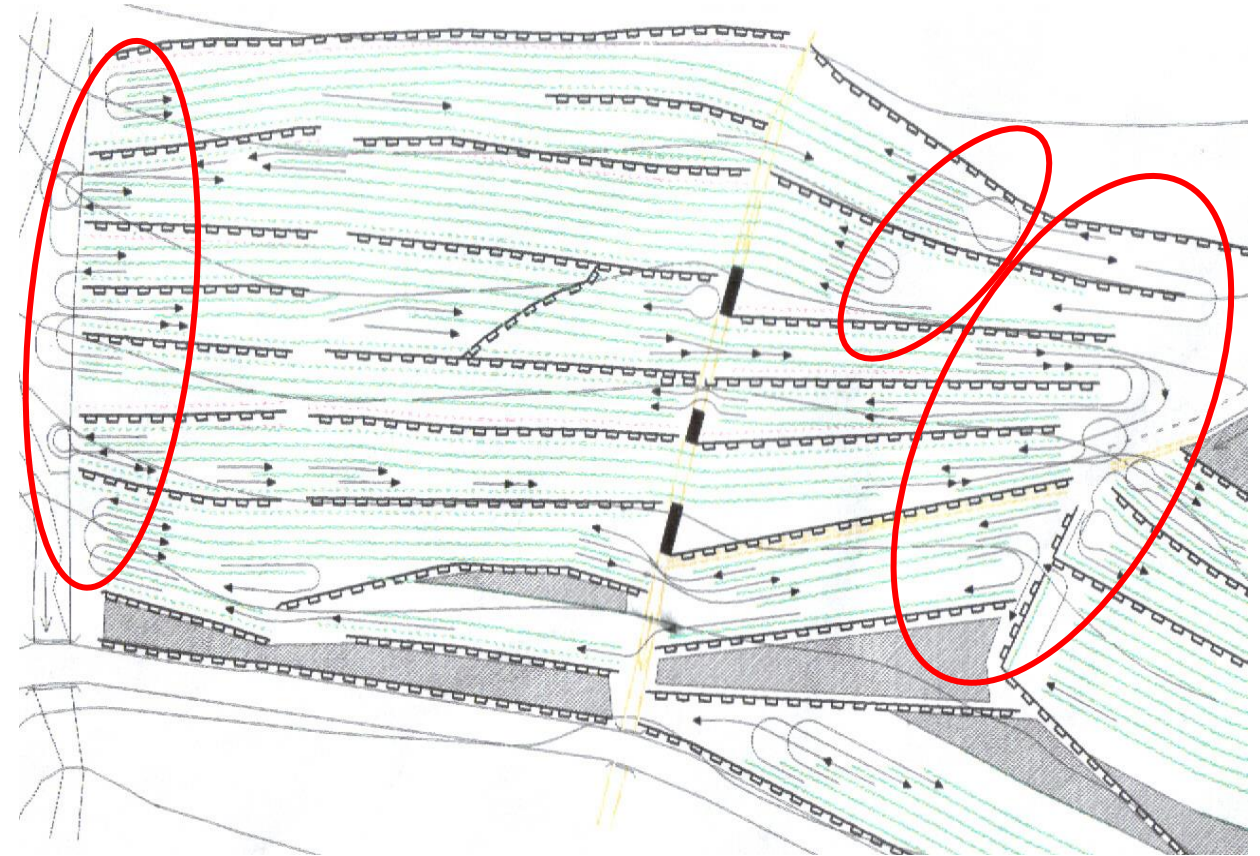
1. Small changes
2. Ideas from workers
3. Spend small
4. Use your existing skill set
5. Self improvement
6. Ownership of work



Logistic, mission planning, auto steering technologies avoid time and inputs waste



On-board tractor monitor: the light green highlight the work done by the machine. The green bar above indicates the right alignment between passages.



Example of CAD functional design for field machinery: the turns and pathways simulation in the headland and critical points of the plots.

Recovery and maintenance areas, the core of farm machinery efficiency



Lean thinking is essential in the high intensity of seasonal farming operations.



Mechanical and electrical checking of the machinery

5. Lean production application in Farming (outdoor activities)



Farming activities in outdoor is subjected to uncertainty that mainly depends on the following factors:

- Seasonal dependences
- Meteorological events especially with Climate Change
- Environmental variability
- Timeliness
- Great periodical working intensity
- Different operative schemes
- Rain, Mud, Dust, Organic liquids, Ice, ...

! It become extremely important to provide a set of different provisional solution appropriate to the possible situation. Especially in rescue events (sanitary, environmental or mechanical)

Example: Criticality in Agricultural Scenarios



Tomato harvest case: all systems are under stress: mechanical, electronical, sensors.
Only a standard control procedure may avoid damages and time waste .



Constrains: deliver the product quickly (this means that the mechanical part must work properly) to the agro-industry for transformation with the same ripeness (this means that the sensing system must select properly between green and red).

Further Reading

❖ **The Lean Guide for winery**

https://www.wineaustralia.com/getmedia/b6b63b37-bde7-49ac-9e7f-b6a8d0fd44e2/2014_The-lean-guide.pdf



References

- ❖ **The Future of Technology in Agriculture**
<https://stt.nl/wp-content/uploads/2016/05/ENG-Toekomstverkenning-agri-food-Web.pdf>