



A learning tool for sustainability at a mixed ecological farm

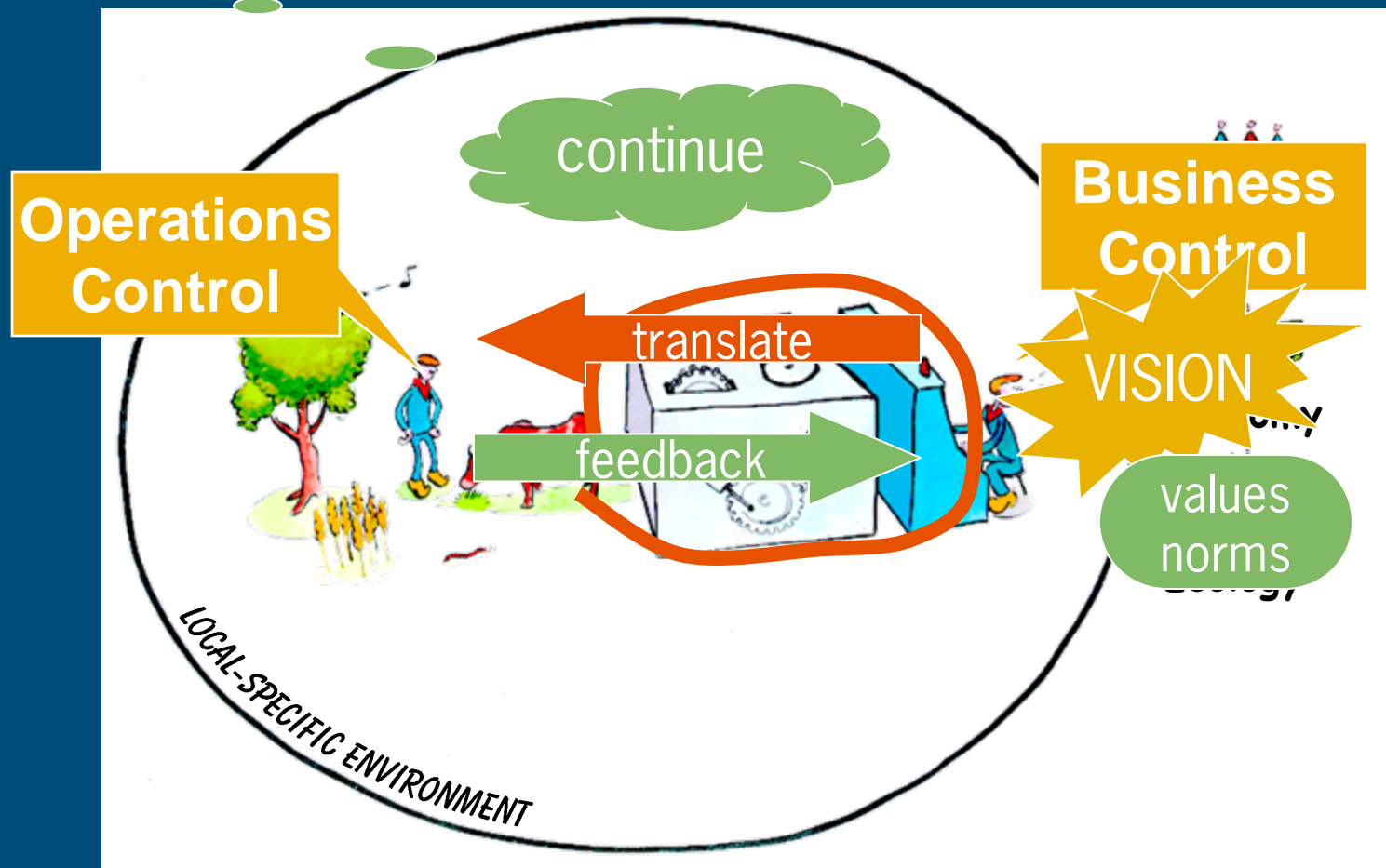
Authors

J. Wolfert, E.A. Goewie – Soc. aspects of Biological Farming

A.J.M. Beulens, H. Scholten – Information Technology

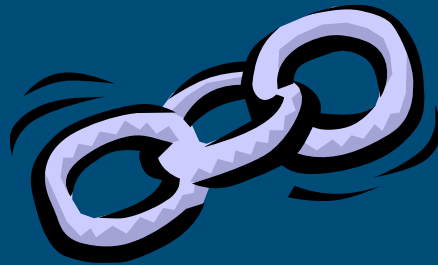
E.A. Lantinga, G.J.M. Oomen – Biological Farming Systems

Sustainable Farm Systems



Mixed ecological farming

- Management characteristics:
 - NO quick-acting instruments
 - Prevention
 - Recycling
 - Chain Management



Management Control

- Negotiation (*values/norms*)
- Heuristic Problem Solving (*learning*)
 - Unstructured → Structured
- Operational Control (*habituation*)



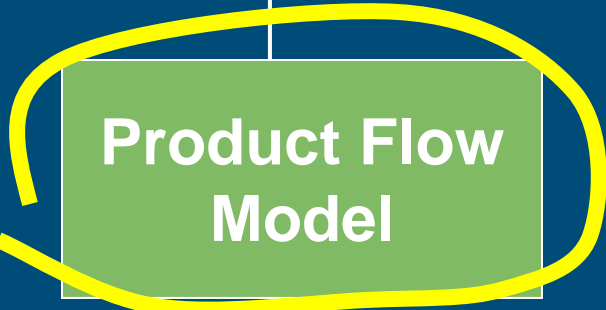
MC model structure and system development

**Sustainability
Goal
Hierarchy**

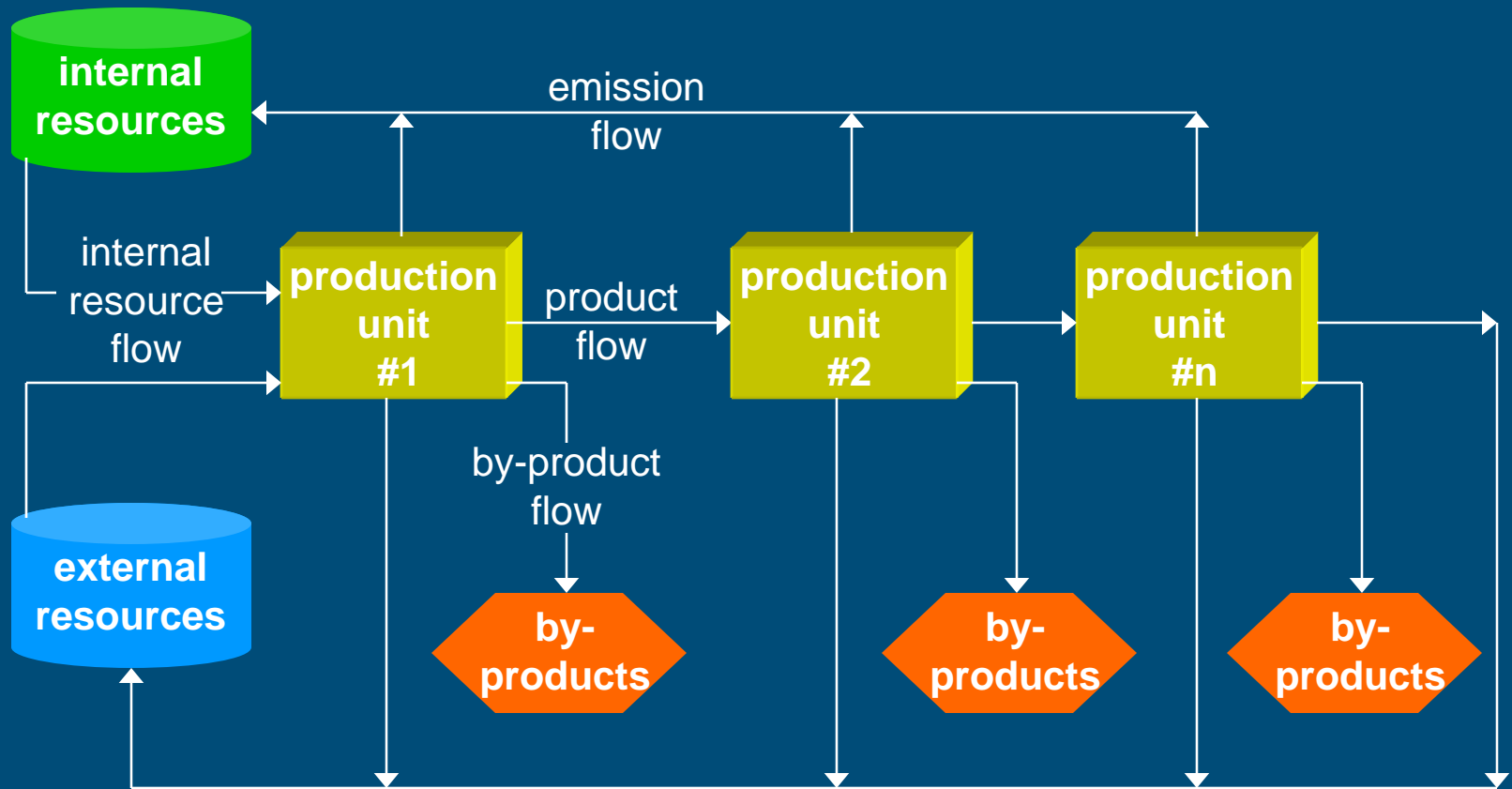
**Sustainability
Function
Deployment**

**Sustainability
Management
Handbook**

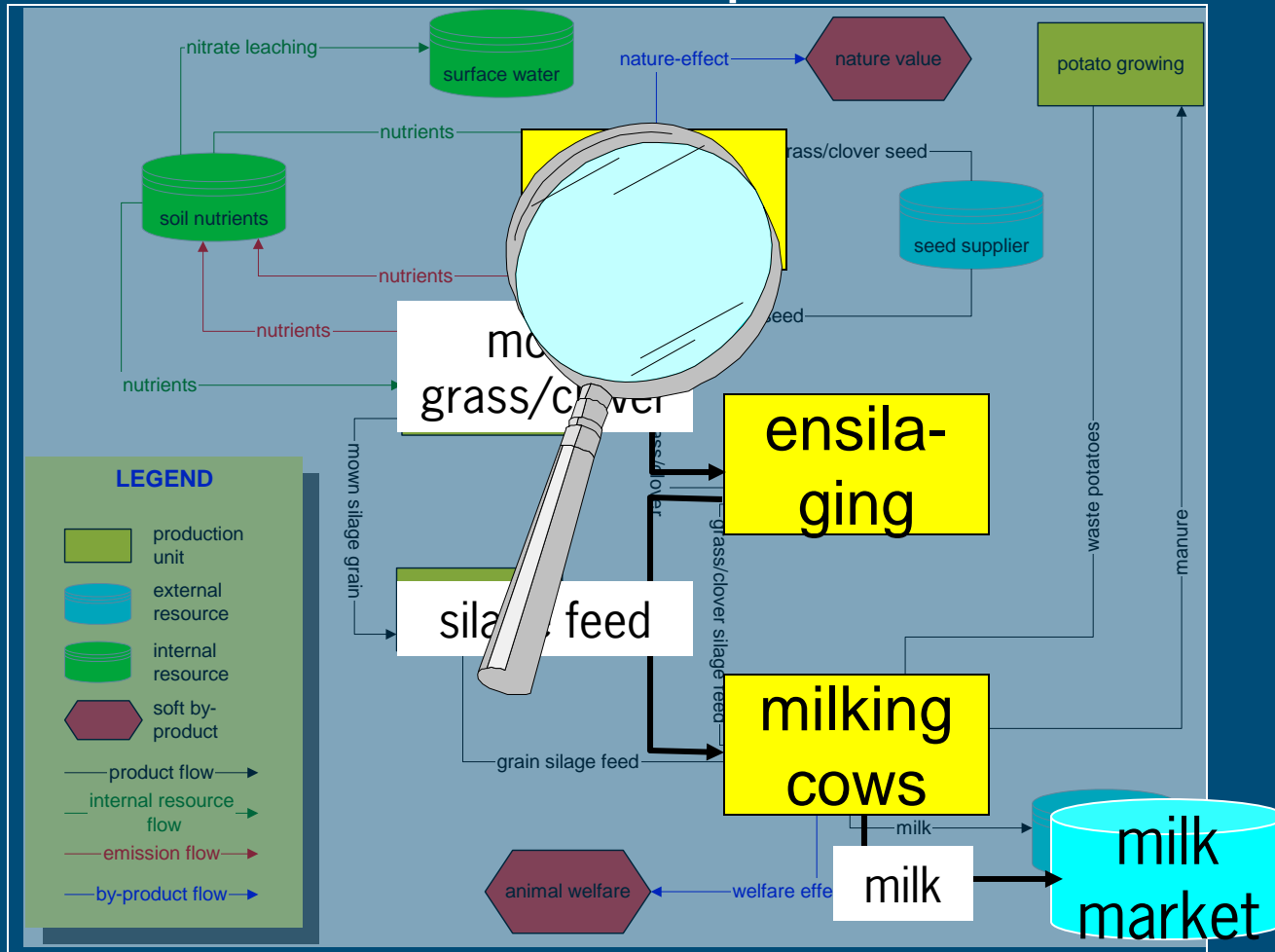
**Product Flow
Model**



Product Flow Model (template)



Product Flow Model (example)



MC model structure and system development

**Sustainability
Goal
Hierarchy**



**Sustainability
Function
Deployment**



**Sustainability
Management
Handbook**



**Product Flow
Model**



Sustainability Mapping

Sustainability Mapper 1.0

- sustainable farm
 - economic
 - farm results
 - arable farming
 - ware potato revenue
 - gross return
 - allocated costs
 - seed potato revenue
 - onions revenue
 -
 - animal husbandry
 - milk revenue
 - gross return
 - price
 - quality
 - fat content
 - protein content
 - bacterial count
 - cell count
 - butyric acid bacteria spores
 - yield

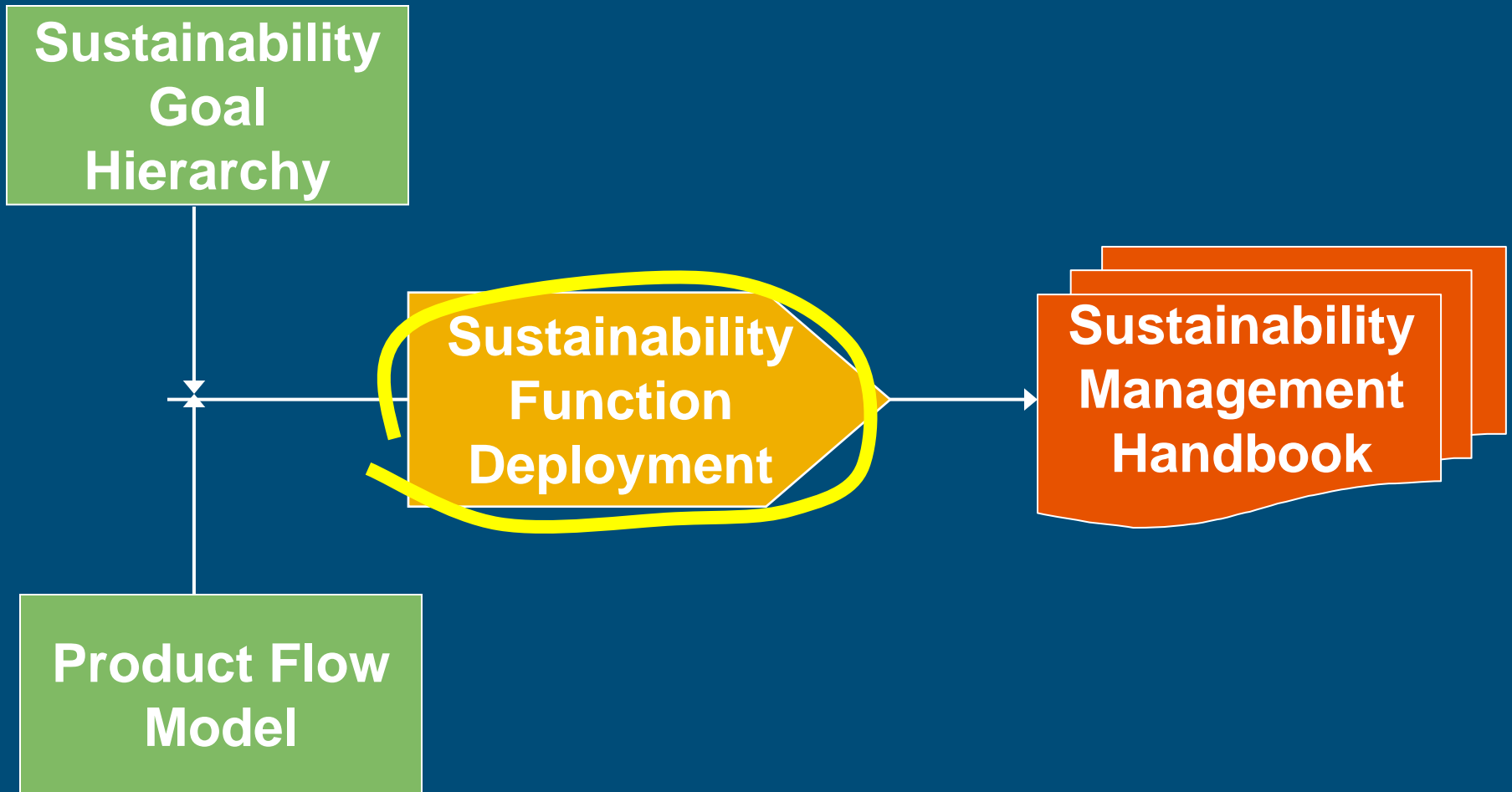
Definition
Source of butyric acid bacteria

| From | To |
|--------------------------|-------------------------|
| grass/clover silage feed | milking cows |
| silage grain feed | milking cows |
| mown grass/clover | grass/clover ensilaging |
| milk | milk market |

Flow

| Flow | To |
|----------------------------|-------------------------|
| 1 grass/clover silage feed | milking cows |
| 2 silage grain feed | milking cows |
| 3 mown grass/clover | grass/clover ensilaging |
| 4 milk | milk market |

MC model structure and system development



Sustainability Function Deployment

property goals-operations

operations [ley growing]

property goals

sand content

grass/clover ratio

dry matter content

structure value

...

determination of critical operations

importance factor (1-5)

4

3

5

2

seed
soil tillage

sowing

growing

mowing

loading

3

9

3

9

9

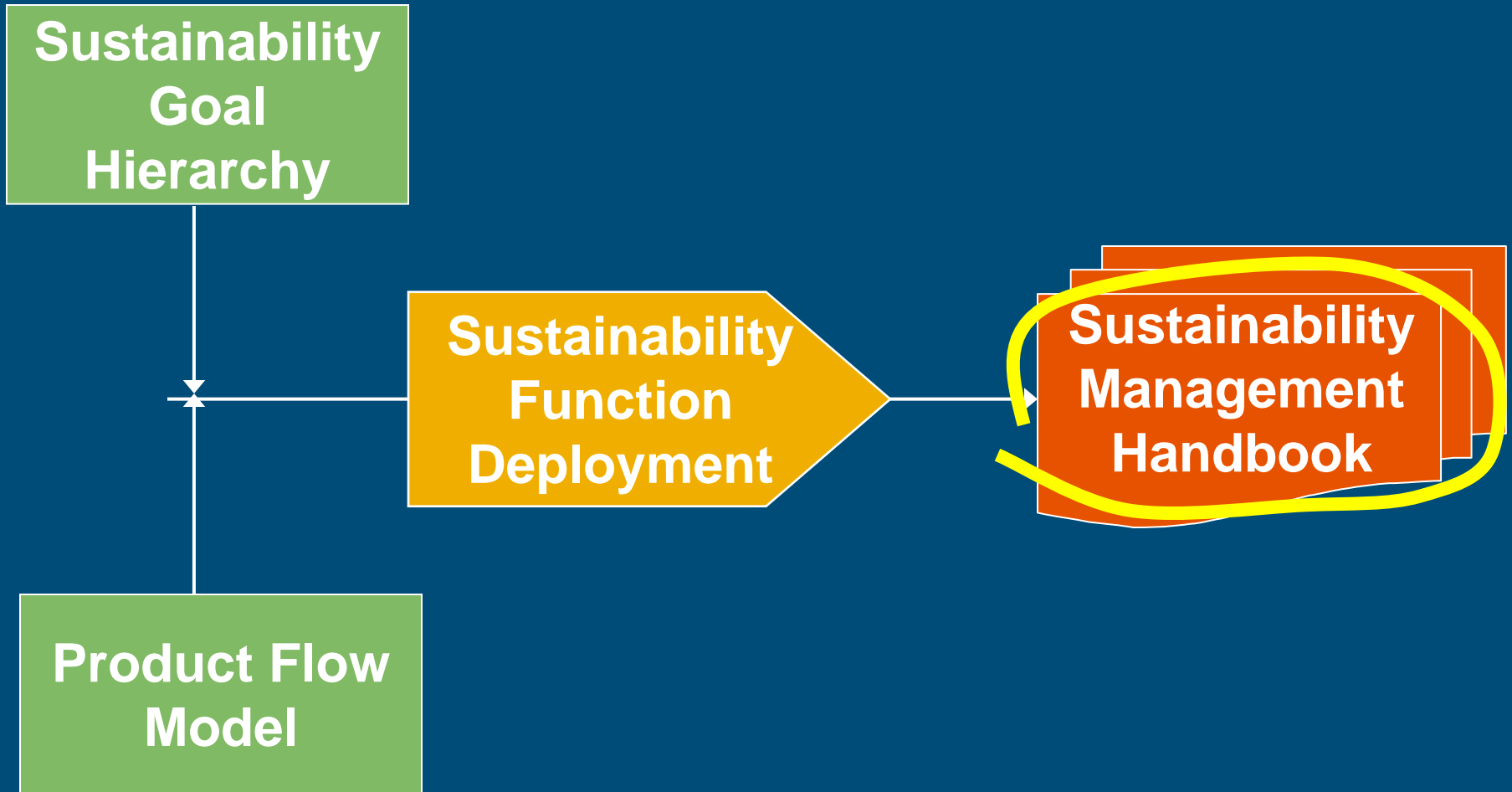
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3

9

MC model structure and system development



Sustainability Management Handbook

Flow details

flow: mown grass/clover

unit: ley growing

preventive measures

instruction

procedures

experiments

history

Soil tillage

- after tillaging, the land must be as smooth as possible

Growing

- regularly check for mole hills and level them

Mowing

- check mower adjustment; re-adjust if necessary

Loading

- use a clean wagon; clean if necessary

Conclusions

- Learning tool
 - Continuous redesign process
 - Translation: sustainability → daily management
 - handbook
 - updated
 - tailored
- *Sustainability emerges with the grip a farmer can get on product properties by monitoring and assurance throughout the complete production process*