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DEGLI STUDI  
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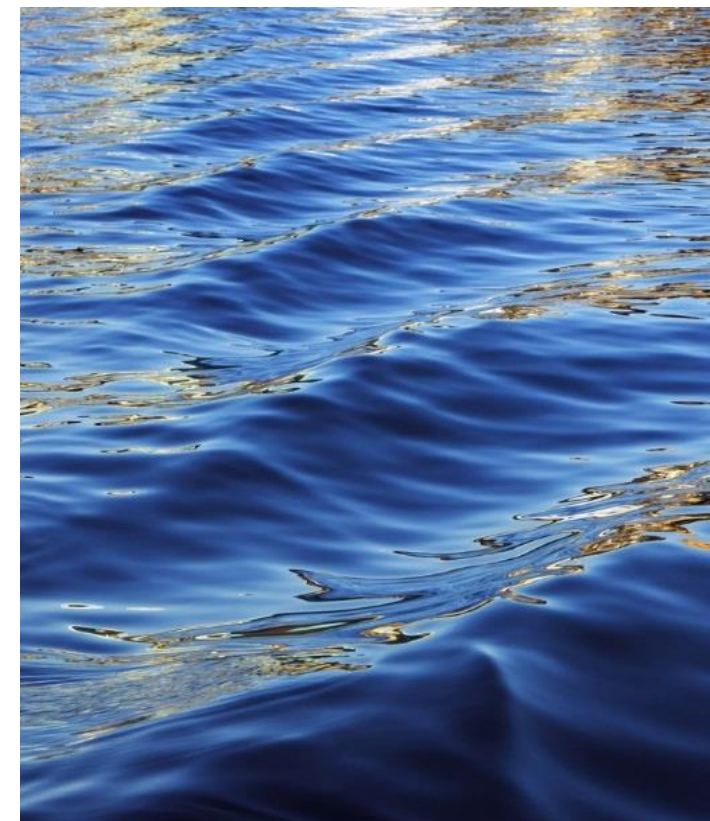


ILHAM-EC

# Participatory workshop

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# Sustainable land management

## Case study-based learning: integrating hard and soft system approaches



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## Case-study base learning

- Framing our learning about Agronomy for sustainable development in the context of Sustainable Land Management (SLM)
  - Learning to addressing **wicked issues** in Agro-ecology
  - Considering **student's** background
  - Teaching understood as **student learning** facilitation



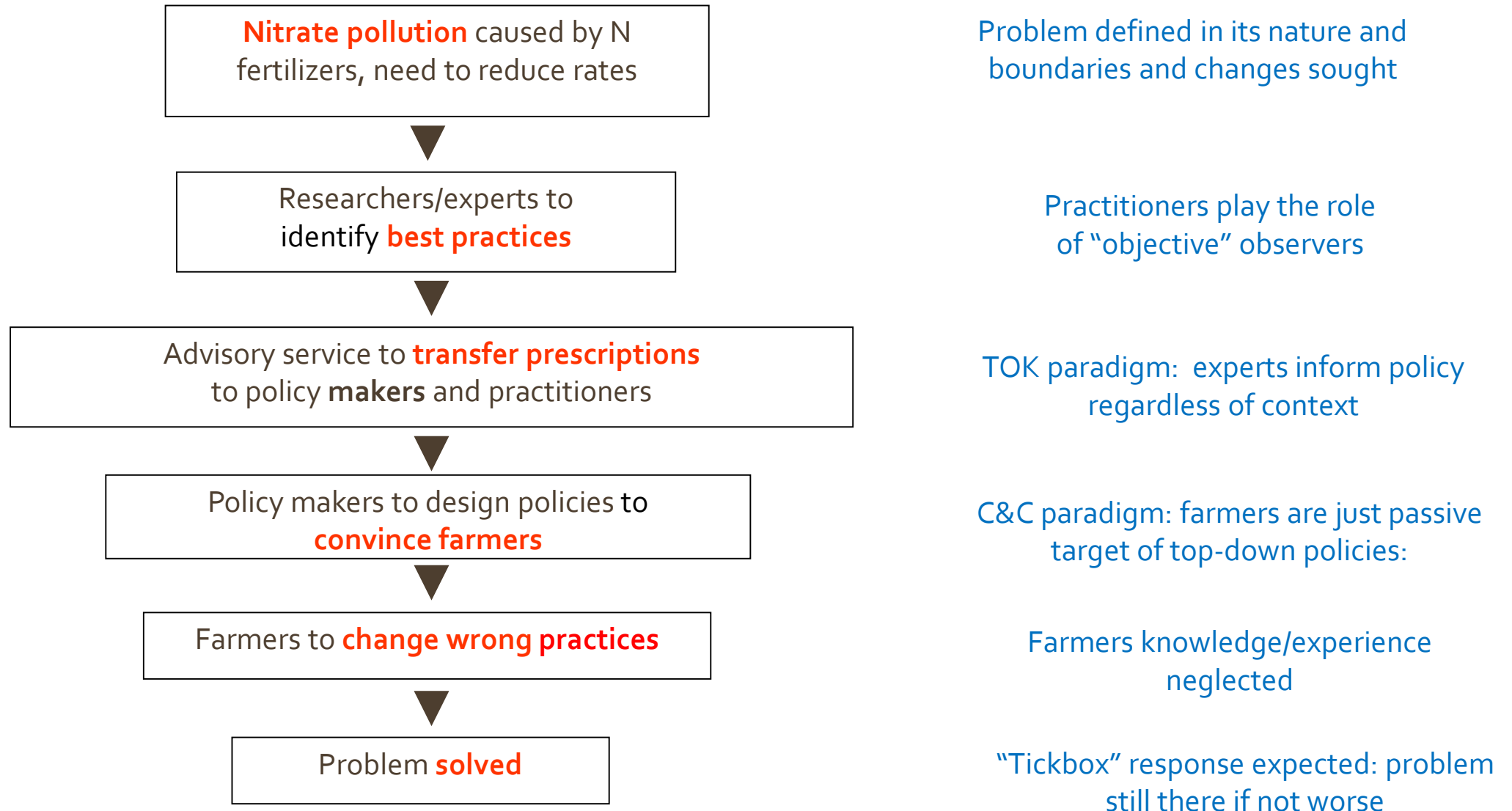


## Case-study base learning

- Framing our learning about Agronomy for sustainable development
  - Learning to address wicked issues in agro-ecology
    - ✓ **misleading learning structures**
    - ✓ multiple-perspectives and implications
      - ❖ deconstructing prejudices
      - ❖ getting the best from the diversity of student's background knowledge



# Type 1 approach





## Case-study base learning

- Misleading learning structures

- Model 1: student's frequent reactions

- ✓ seek for **linear solutions** to “solve” complex issues
- ✓ accept the **few tools** they got as a “panacea” to address many different problems
- ✓ focus on the **exam** as the final scope of their learning
- ✓ graduated ultimately consider **farmers as the target** to deliver of their own “graduated” knowledge
- ✓ **do not learn how** to exploring, listening, reading, reporting, address uncertainty...
- ✓ prefer to **study by topic**, chapters
- ✓ do not learn how to make best use the **variety of knowledge** gained from other disciplines
- ✓ **do not struggle** to address issues in a systemic way

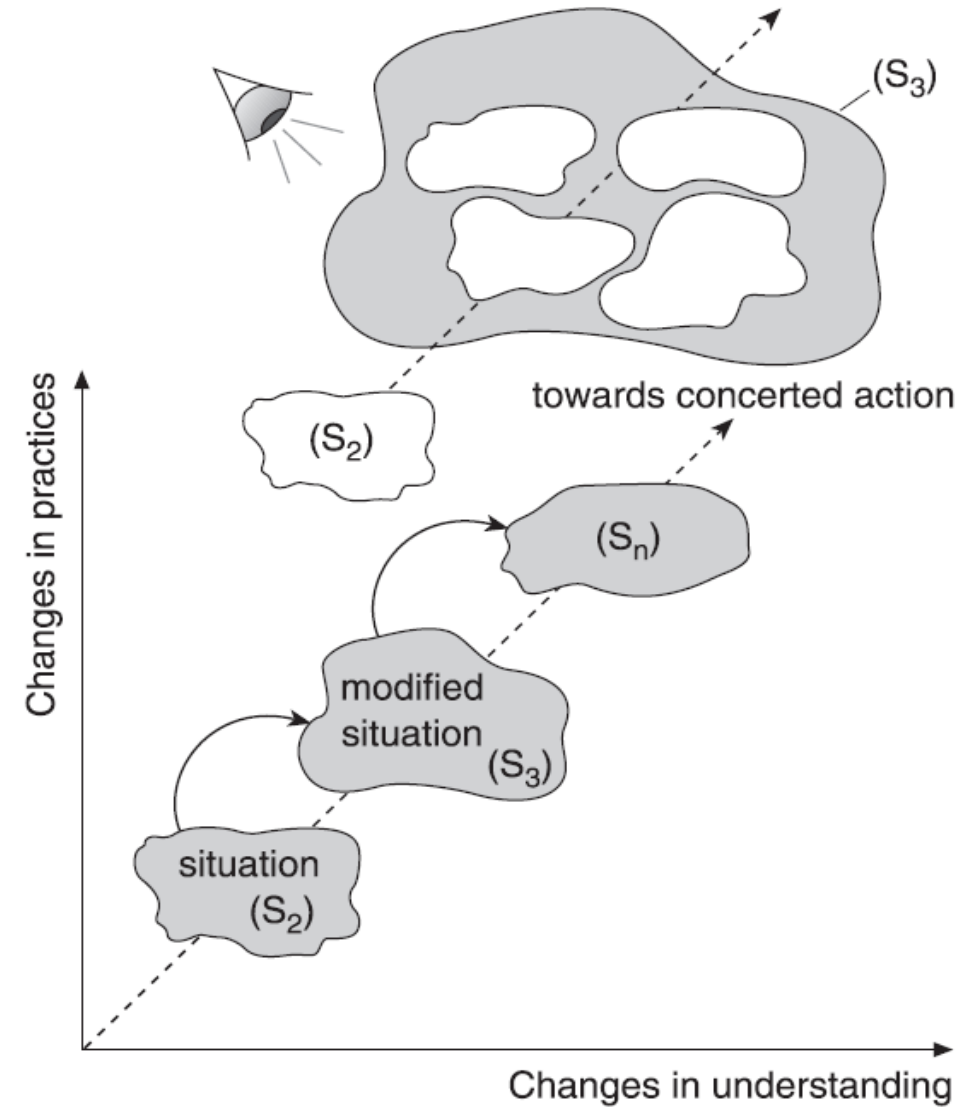
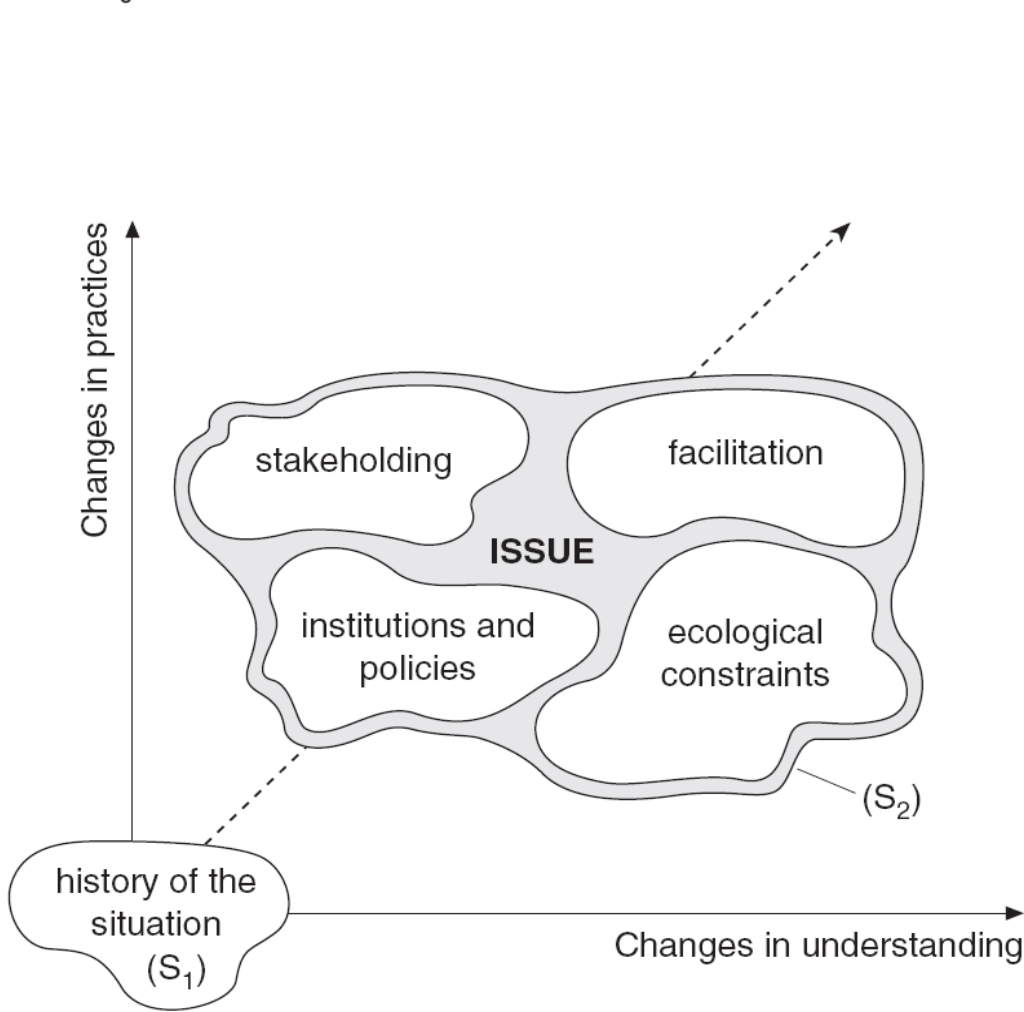
- Linear thinking does not help in learning how to address complex issues...



## Case-study base learning

- Framing our learning about Agronomy for sustainable development
  - Learning to address wicked issues in agro-ecology
    - ✓ frequent misleading learning structures
    - ✓ **multiple-perspectives and implications for learning pathways**
      - ❖ deconstructing prejudices
      - ❖ getting the best from the diversity of student's background knowledge









## Case-study base learning

- Case studies provide a concrete context-dependent **situation** to appreciate:
  - **interdependencies** between biophysical processes and multiple stakeholders
  - **complexity**: the mix of biophysical (hard) and socio-economic (soft) constraints
  - **uncertainties**: unintended/unexpected consequences of a given action/option adopted
  - **controversies**: emerging between stakeholders on pathways to engage to improve the situations



# Type 2 approach



Make quantitative  
measurements

Water polluted from nitrates  
(entry point)

Storytelling,  
semistructured  
interviews

Appreciate variety  
of perspectives

student to quantify bio-physical  
data and appreciate multiple  
dimension of the issue



problem "de-constructed" & re-  
defined

Appreciate the  
complex (hard+soft)  
and multidimensional  
nature of issues

Learn how to use  
quantitative tools  
eg modeling

Joint assessment of data/info needed, drivers,  
inter-relationships and actions to take

Stimulate enthusiasm in  
identifying improvement  
pathways

Refresh  
background  
knowledge

generating new spaces for new  
hypothesis and options

Systems  
diagramming

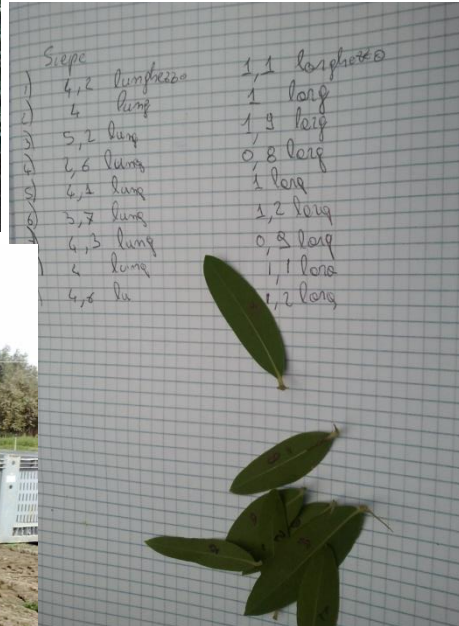
Stakeholder  
analysis

increased capacity of operationalize  
knowledge, solving, adapting and managing

interpretation of  
quantitative data



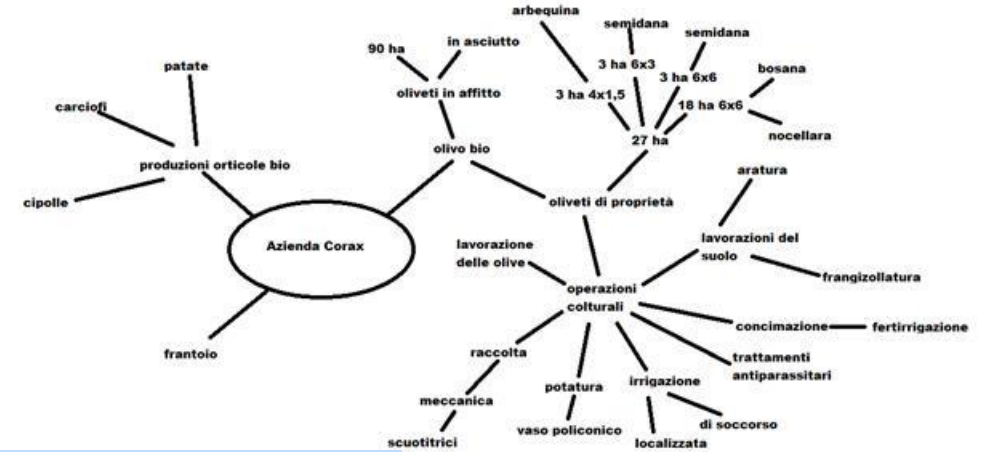
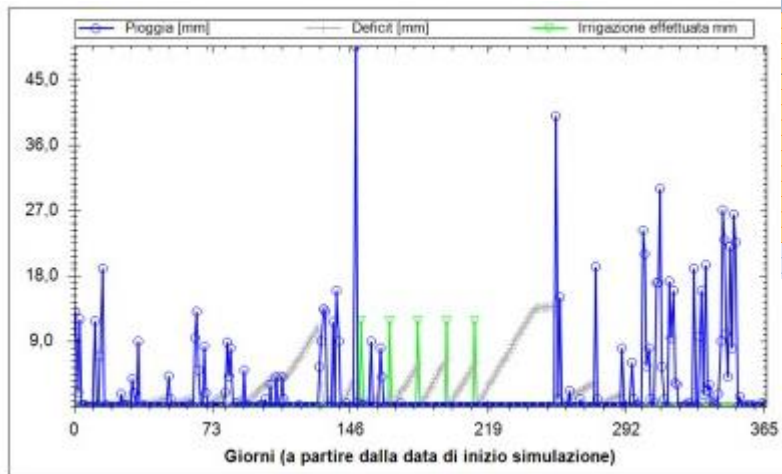
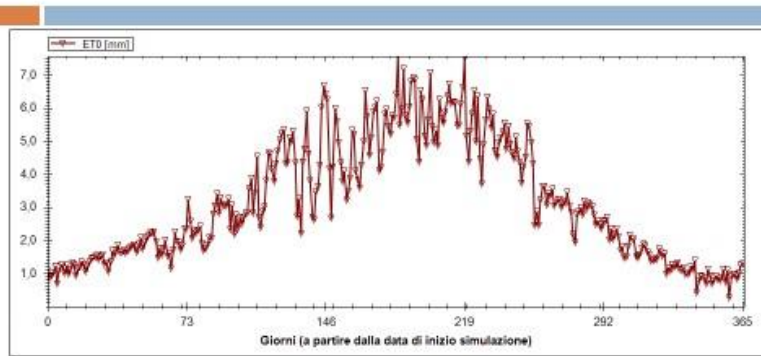
# Take quantitative measurements







## Bilancio idrico: ET<sub>0</sub>



	A	B	C	D	E	F	G	H
1								
2								
3	Media di Tmed	MONTH						
4	YEAR	1	2	3	4	5	6	
5	3000	10.23903226	12.43232143	11.31854839	12.90033333	17.73693548	19.09	24.08939
6	3001	11.90677419	9.773571429	10.42870968	12.95	16.14822581	22.00366667	24.11306
7	3002	10.20241935	10.05017857	9.97983871	14.84833333	20.665	22.141	22.92096
8	3003	8.894032258	9.832857143	14.15241935	15.042	19.5066129	20.65933333	24.06588
9	3004	10.25435484	10.96258621	13.04354839	14.152	19.94048387	20.44583333	23.21205
10	3005	10.50209677	9.991785714	11.46016129	13.07383333	17.5083871	22.43483333	24.53677
11	3006	11.30758065	10.51107143	10.77693548	15.253	17.46741935	22.933	24.34032
12	3007	9.216290323	9.005892857	9.590483871	13.705	16.17629032	23.0785	25.69932
13	3008	10.84112903	11.15206897	13.60435484	14.89033333	17.54419355	17.8775	24.52982
14	3009	9.116612903	7.378214286	11.21564516	15.26816667	19.83467742	20.21483333	25.01222
15	3010	9.289032258	8.679821429	11.07951613	14.751	16.15419355		
16	3011	10.16129032	11.04053571	12.54854839	13.09533333	18.44580645	Media di Tmed	2256
17	3012	10.13790323	13.22913793	11.38709677	15.22683333	19.39951613	Valore: 20.21483333	1612
18							Riga: 3009	2967

## Analisi SWOT lavorazioni

Helpful	Harmful
<ul style="list-style-type: none"> <li>*Contenimento delle infestanti</li> <li>*Aumento della velocità di infiltrazione dell'acqua</li> <li>*Interramento concimi</li> <li>*Conservazione delle piogge invernali e primaverili</li> </ul>	<ul style="list-style-type: none"> <li>*Incremento dell'erosione idrica ed eolica, soprattutto su suoli in pendenza e sabbiosi</li> <li>*Formazione della suola di lavorazione</li> <li>*Approfondimento forzato delle radici</li> <li>*Alto costo lavorazioni</li> <li>*Perdita nutrienti per dilavamento</li> <li>*Accelerazione processo mineralizzazione</li> </ul>
<ul style="list-style-type: none"> <li>*Gestione degli oliveti asciutti</li> <li>*Alternanza con altre tecniche nei sistemi di gestione complessa</li> </ul>	<ul style="list-style-type: none"> <li>*Rischio ritardi nelle operazioni di raccolta</li> <li>*Possibili danni diretti e indiretti (ingresso patogeni) a causa di ferite sulle radici</li> </ul>



# Case-study based learning

- Framing our learning about Agronomy for sustainable development
  - **Student's background required**
    - ✓ Basic science needed (eg chemistry, statistics, agronomy...)
    - ✓ Technical requirements and facilities (PC sw, videocamera, specific measuring equipment)
  - **Teaching = learning facilitation**
    - ✓ provide information (eg on UN conventions, updated trends in science...)
    - ✓ enable the use of self-learning tools (eg models,
    - ✓ enable the use of assessment tools, both qualitative and quantitative
  - **Constraints**
    - ✓ not easy (but maybe not impossible) to deliver this by e-learning only
    - ✓ no. of students per classroom
    - ✓ access to mobility funding

