Managing Transdisciplinary Consortia

Jan Frouz
Institute for environmental research
Fac. Science, Charles University
Praha, Czech Republic

What is transdisciplinary research

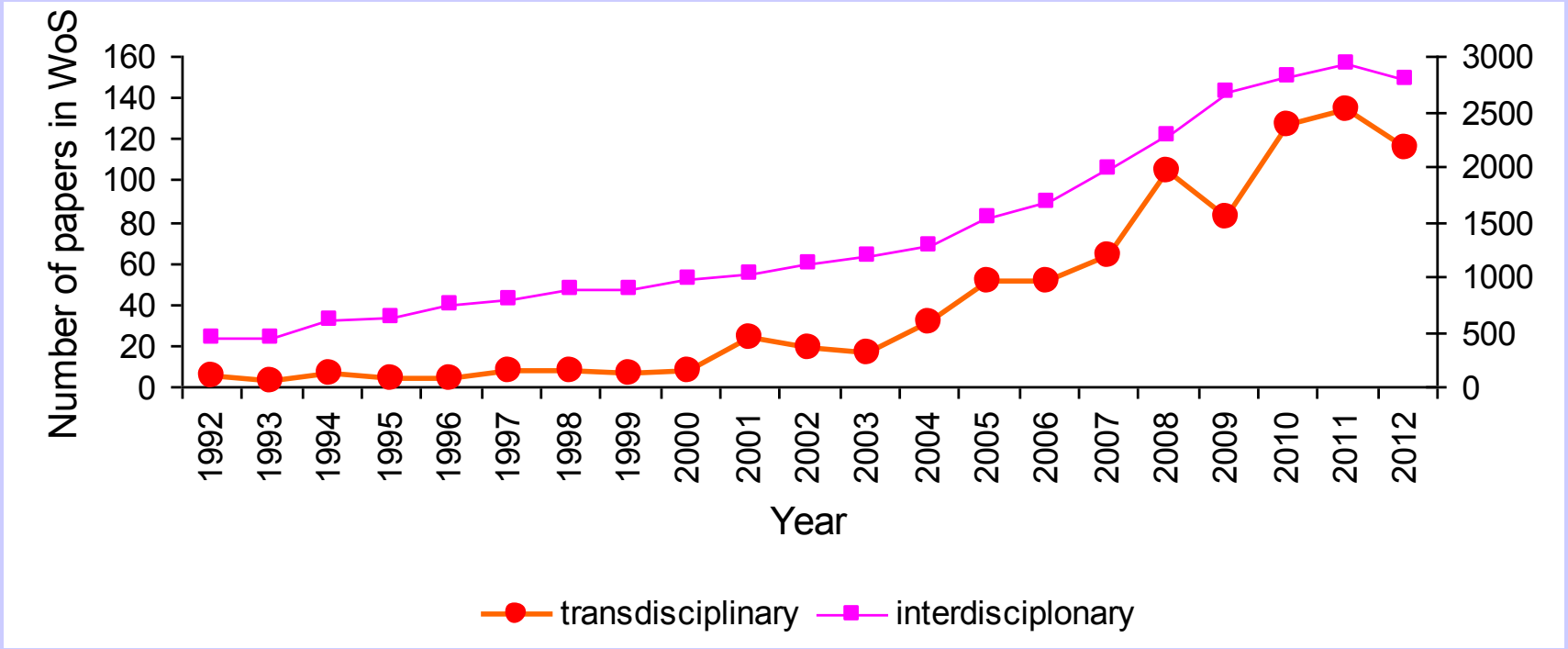
- **Specialized research** give answer on very specialized question, (simple answer on complex questions) that may however have large implication for whole field

- **Interdisciplinary research** combine several subdisciplines or related disciplines to give understanding of complex problem

- **Transcisciplinary research** Aimed on very general questions, (simple question with complex answer), often question combine natural and social processes, require cooperation of experts from different disciplines often combining natural and social science with humanities and non academics.

Why we need it

- increase our fundamental understanding
- problem solving
- reflection action



Interdisciplinary research

- Individual subdisciplines have their approaches
- Sometimes differences in aproaches may lead to seemingly diferent results
- But there is the same subject

Soil Biology &

Contents lists ava

Soil Biolo

journal homepage: v

ELSEVIER

Dominant trees affect microbial com
post-mining afforested soils

Jaroslav Šnajdr [a], Petra Dobiášová [a], Michaela L
Jan Frouz [b], Petr Baldrian [a,*]

[a] Institute of Microbiology of the ASCR, v.v.i., Vídeňská 1083, 142 20 Prague 4, C
[b] Institute of Soil Biology, Biology Centre of the ASCR, v.v.i., Na Sádkách 7, 370 (

ARTICLE INFO

Article history:

ABSTRACT

The aim of this wor

EUROPEAN JOURNAL OF SOIL BIOLOGY 44 (2008) 109–121

available at www.sciencedirect.com

ScienceDirect

journal homepage: http://www.elsevier.com/locate/ejsobi

ELSEVIER

EUROPEAN JOURNAL OF SOIL BIOLOGY

Original article

Interactions between soil development, vegetation and soil fauna during spontaneous succession in post mining sites

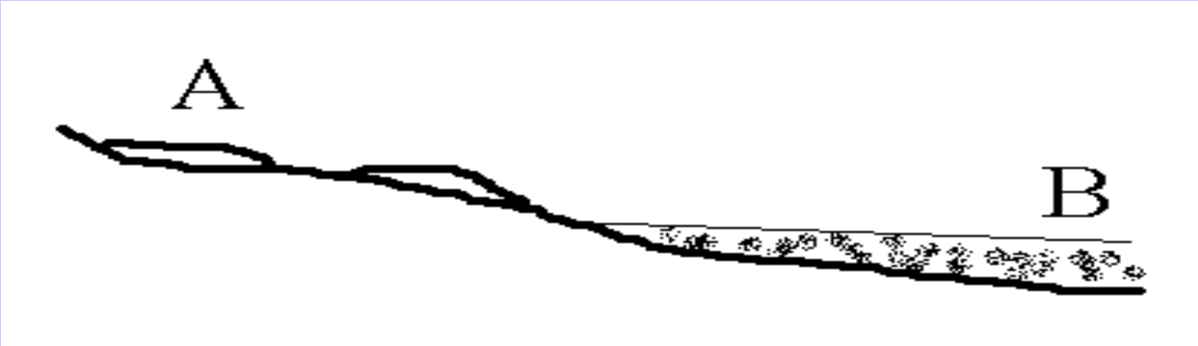
Jan Frouz[a,b,], Karel Prach[b,c], Václav Pižl[a], Ladislav Háněl[a], Josef Starý[a], Karel Tajovský[a], Jan Materna[d], Vladimír Balík[a], Jiří Kalčík[a], Klára Řehounková[b]*

[a] Institute of Soil Biology, Biology Centre AS CR, Na Sádkách 7, CZ-37005 České Budějovice, Czech Republic
[b] Faculty of Sciences, University of South Bohemia, Branišovská 31, CZ-37005 České Budějovice, Czech Republic
[c] Institute of Botany AS CR, Dukelská 135, CZ-37982 Třeboň, Czech Republic
[d] Krkonoše National Park, Museum of Krkonoše in Vrchlabí, Husova 213, CZ-54311 Vrchlabí, Czech Republic

ARTICLE INFO

ABSTRACT

Interdisciplinary research



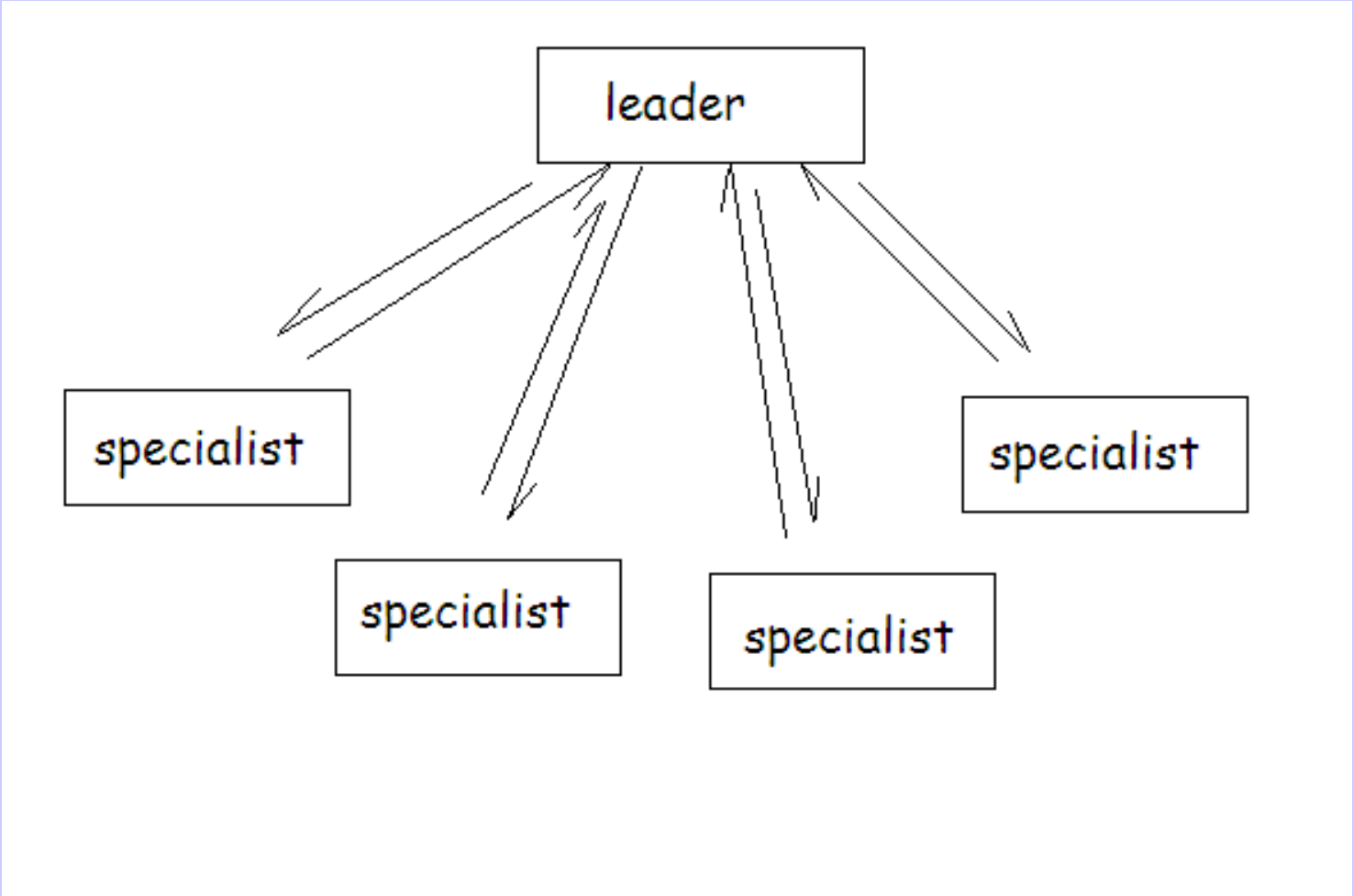
		depth (cm)	moisture (%)	density (g cm^{-3})
site A	moss	2	78	0.2
site B	soil	5	25	1.3

	individuals per			
	cm^2	cm^3	g půdy (DW)	g půdy (FW)
A	5000	2500	12500	2750
B	5100	1020	785	588
	A<B	A>B		
		2x	16x	5x

To run interdisciplinary research one „only“ need:

- common question (goal)
- formulation of such question is manageable by one person expertise (suported and purified by discussion)
- make sure data from subdisciplines are comparable
- enough diplomacy to convince people to do thing slightly differently
- enough communication skills to present results

In extreme case one person can communicate interdisciplinary work with group of specialist, bring the ideas, set up the plan, make sure data will fit, push the people to do the work as planned and communicate it outside.



Pitfals of interdisciplinary research

- You need person with broad overview in the filed and detail knowledge and expertise in one or several subdiciplines
- Such persons are difficult to get
- Recent academic training dictate specialisation (increasing volume of literature, new aproaches more specialised question, whole teams get specialised, publication constrais, broad paper have dificulties to get reviwed etc.)

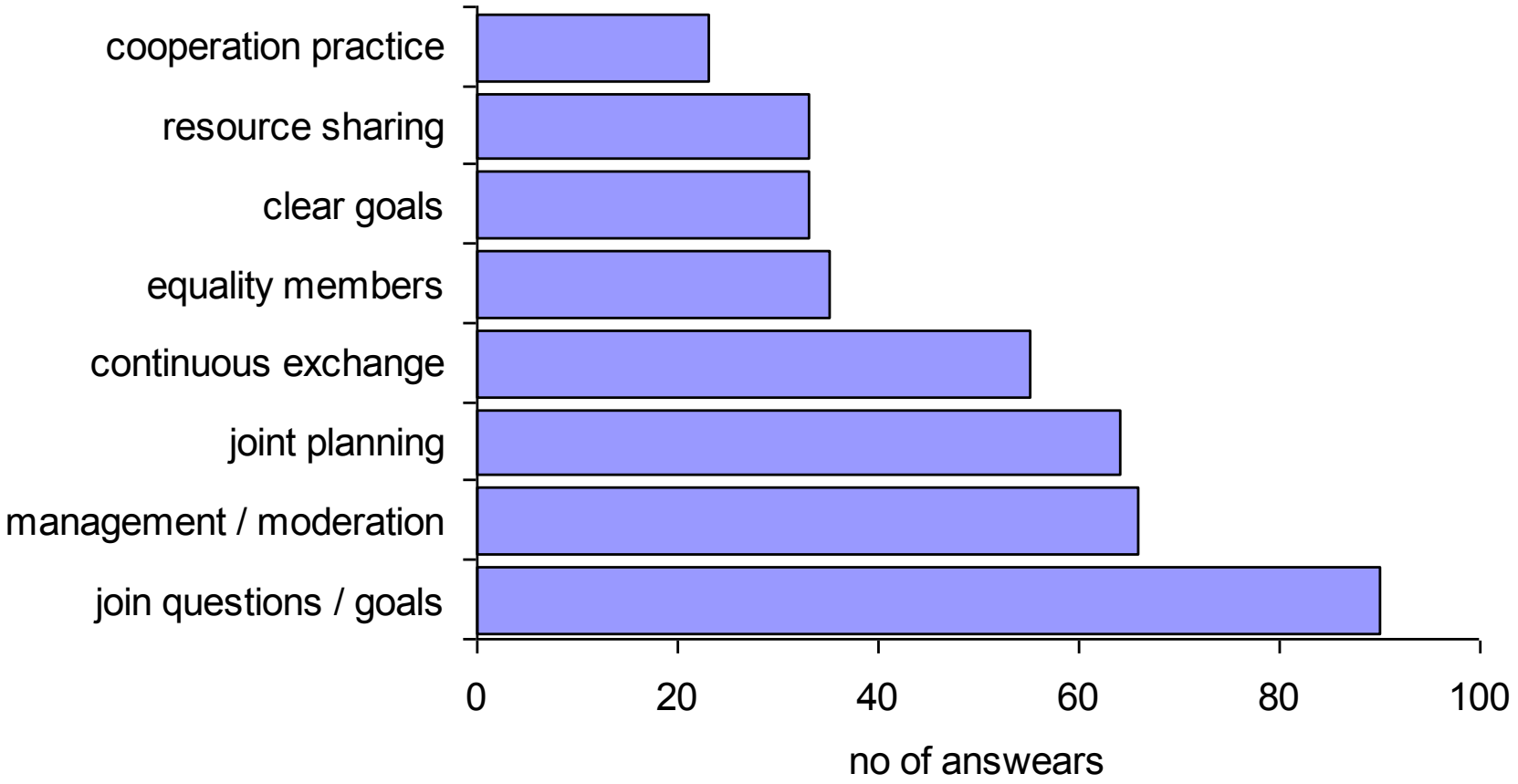
How transdicsiplinary research looks like

	authors	community & sociology	health	agriculture	environment & ecology	behavior & psychology	informatic	teory of science	review	model	data
Salis et al. 2006.	6	xx	xx		x	xx			xx	xxx	
Dahl 2004. .	1		xxx			xx			xxxxx		
Pescosolido 1992	1					xxxxx			xxxxx		
Hjorland and Albrechtsen 1995	2						xxxxx			xxx	
Rosenfield 2013	1	xx	xxx						xxxxx		
King et al., 2002	5	xx	xx						xxxxx		
Stolols et al., 2008	4								xxxxx		
Horn and Casaway 2007	2		x			xx		xx	xxxxx		
Knight et al. 2008	6	x			xxx	x			xxxxx		
Holdenrieder et al., 2004	6				xxxx				xxxxx		
Shields et al., 2005	5	x	xxx			x			xxxxx		
Karl 2002	1				xxxxx				xxxxx		
Turner et al., 2003	3	x	xx			xx			xxxxx		
Ammenwerth et al., 2004	6	x	xxx				x		xxxxx		
Leydesdorff 2008	1						xxxxx		xx	xx	x
Stokol 2006	1					xxxxx			xxxxx		
Tress et al. 2001	4	xx			xxx				xxxxx		
Fry 2001	1	x		xx	xx				xxxxx		
Nelson et al., 2002	6					xxxxx			xxxxx		
Sallis et al. 2002	3		xxx		x	x			xxxxx		

Usually review

Often interaction between health and behavior (or community) or environment and community

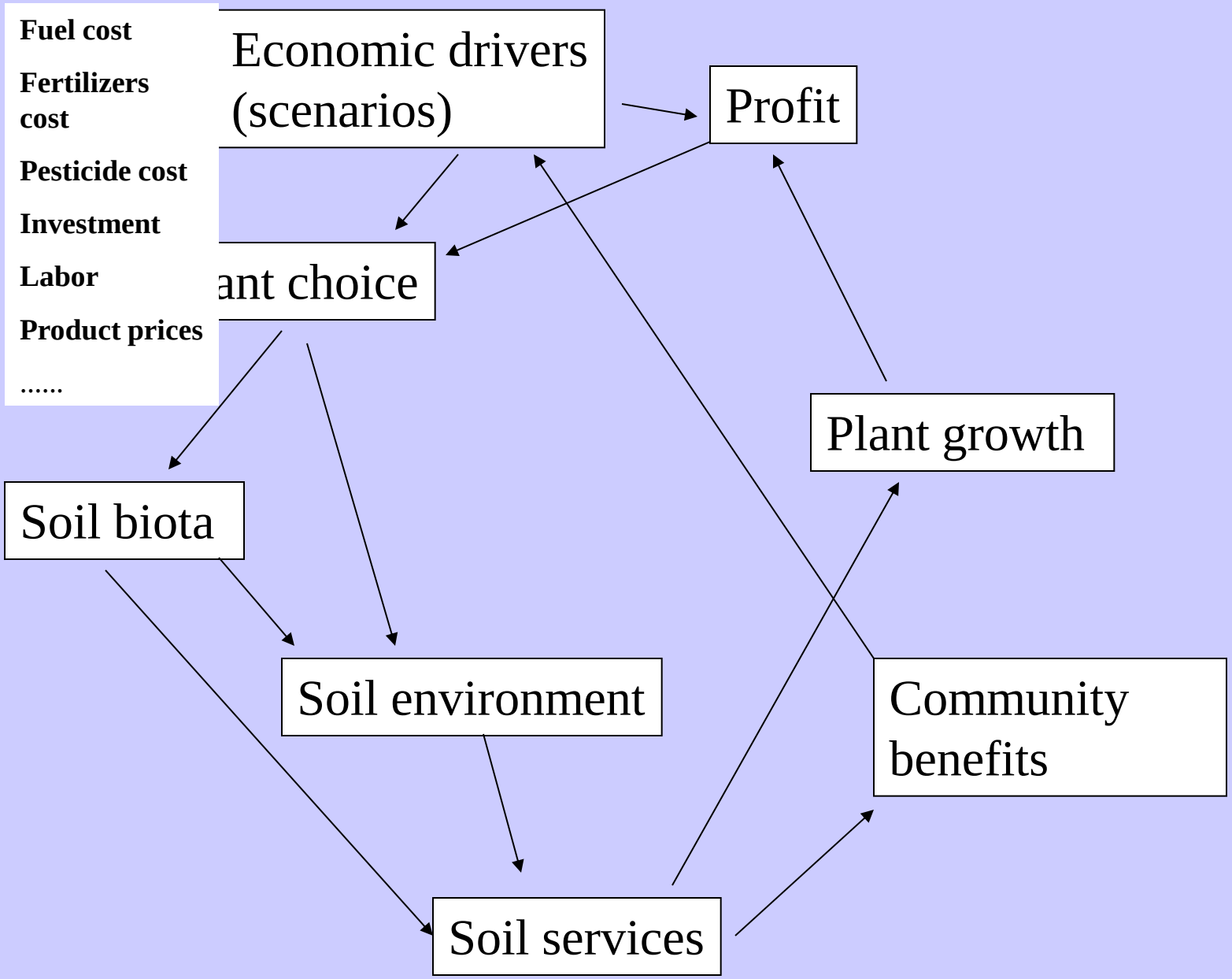
The most essential factors for succes of transcisciplinary reseatch

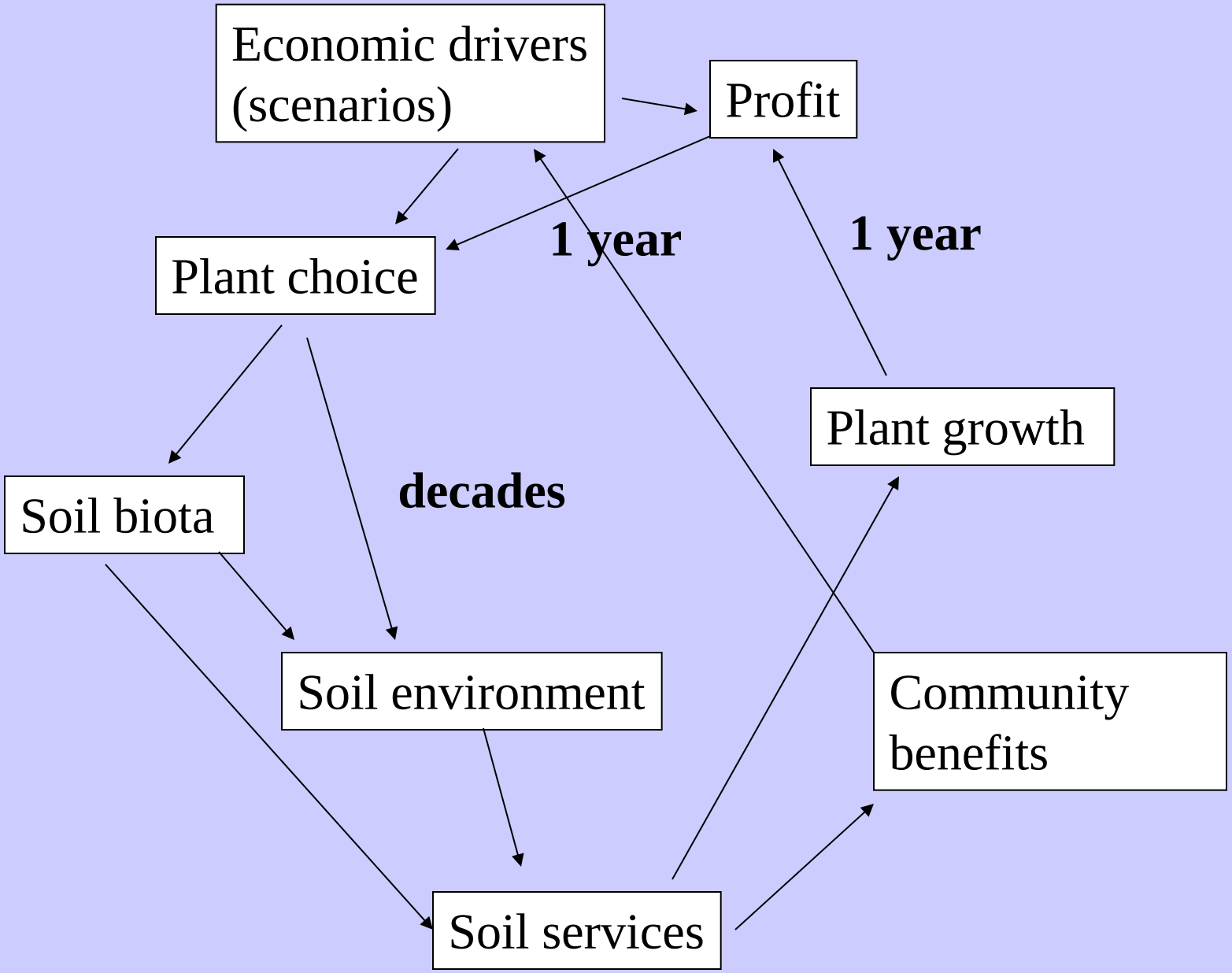


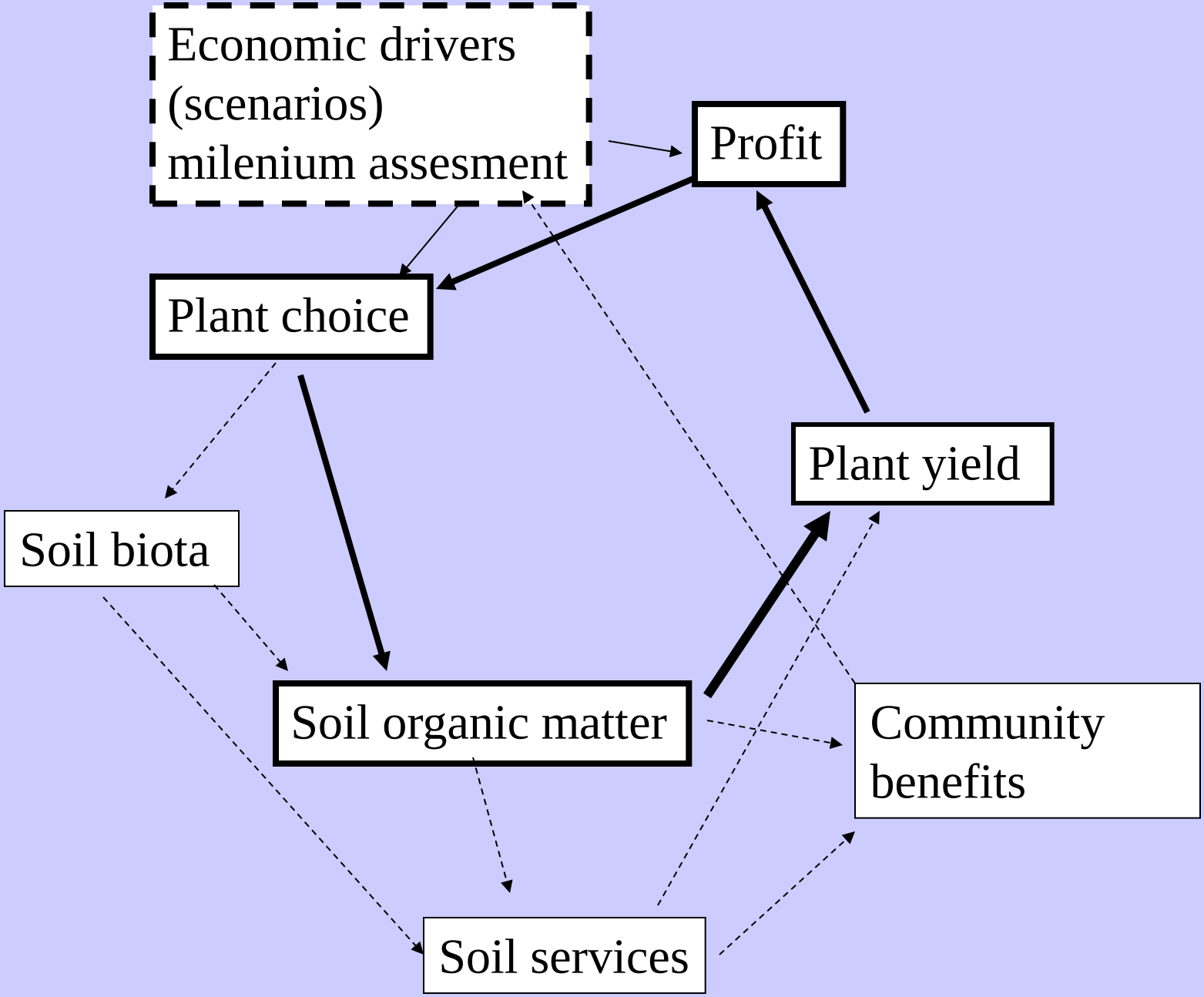
Hollander et al.,

SoilService

- Leader Katarina Hedlung (Univ Lund)
- How the growing of energetic plants affect provision of ecosystem services


Fuel cost
Fertilizers cost
Pesticide cost
Investment
Labor
Product prices
.....
Economic drivers (scenarios)
Profit
ant choice
Plant growth
Soil biota
Soil environment
Community benefits
Soil services


Economic drivers (scenarios)
Profit
1 year
1 year
Plant choice
Plant growth
decades
Soil biota
Soil environment
Community benefits
Soil services


Economic drivers
(scenarios)
milenium assesment
Profit
Plant choice
Plant yield
Soil biota
Soil organic matter
Community
benefits
Soil services

Major challenges

- Choose critical parameters and their interactions.
- They should be have high correlation with system changes and should be manageable
- Some time simplified major scheme is useful
- Combining economic variable with short response time to soil organic matter with long response time

How we did id

- We start with conceptual idea
- then on the meting everybody come up with parameters that describe major drivers and interactions that connect them
- major potential effect that paremeter may have was assessed (effect on yield, effect on yield stability and effect on

Environmental research

- Program joining 7 faculties and other parts of Charles University
- Include science, humanities, law, medicine
- Established 2012
- body with high ability to do TRDS
- kick of meeting
- book

Higher education and transcisciplinary research

- Talented students of study program, which do not prepare researchers, but practitioners are better prepared for transdisciplinary research.
- Research driven study program specialize students too soon, do no train them to combine knowledge from various disciplines and make hierarchy of problems (not only significance but also impact)

What higher education can do to promote transdsciplinary research

- Generate people with broader overview but at the same time with capacity to do detailed research in one specialized filed
- Promote out of box thinking
- Promote ability to communicate specialized research to non specialists
- Tolerate and promote „scientific hobbies“ (namely as an employer)

What academic community can do

- Look for complex question that will help better understant the system KCQ not just question that are practically driven
- Funding opportunities
- Journals meetings and other platform.
- reviewers (scientific community)
- better cooperation between “science” and “humanities”

Decision makers and TDRS

- Support evidence based decision
- made decision which will be evidence based
- ask for evidence based arguments
- ask for complex plan not just end of pipe solution
- work with longer time scale

Thank you for your attention