



Farmer adoption of nutrient management planning: accounting for heterogeneity

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Overview

- Background
- Nutrient management planning
- Conceptual framework
- Method
- Results / Discussion
- Conclusion

Background

- Increase in global demand for food
 - ❖ 9 billion humans by 2050
 - ❖ ↑ global per capita incomes - between 1950-2000 of 2.1%
 - ❖ Increase in demand for meat/dairy – 59% to 98% by 2050
- Ag. Production has intensified
 - ❖ More produced from the same amount of land
 - ❖ Since 1960s 9 fold increase in synthetic N and 3 fold in P
- Environmental & economic consequences



Solution: improve nutrient management

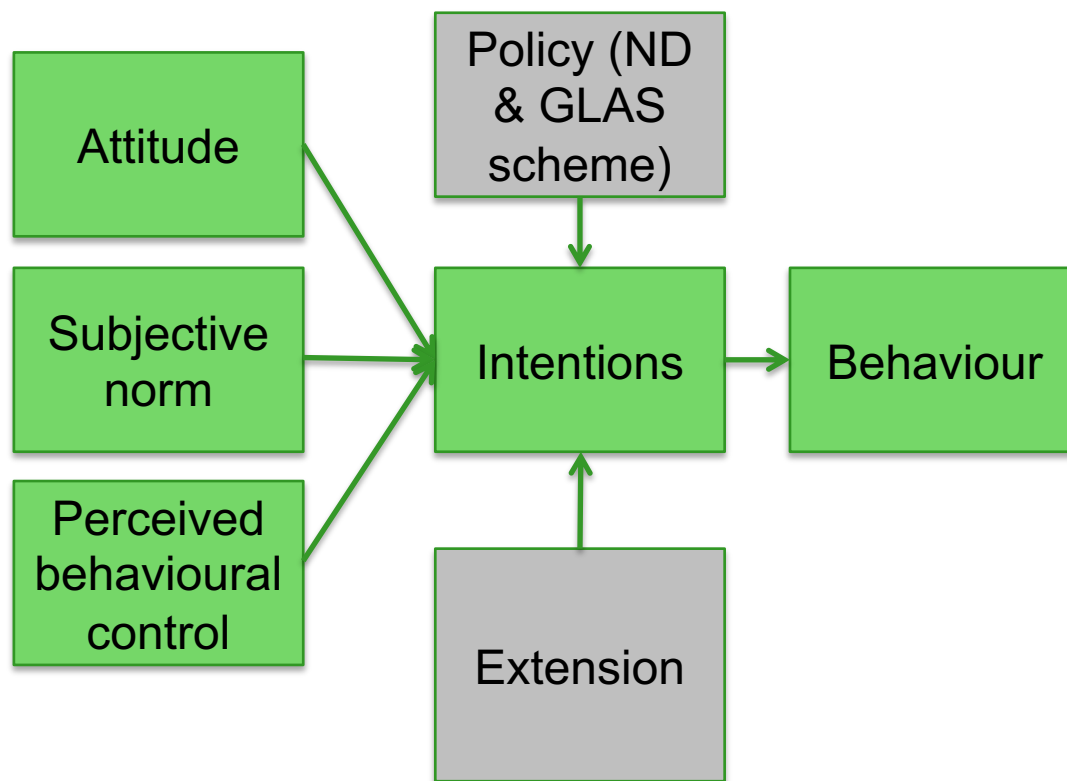
- Nutrient management planning (concept)
 - ❖ Process of planning and optimizing for manure and fertiliser applications
 - ❖ Aim to maximise economic returns whilst minimising environmental risk
- Nutrient management plan (practice)
 - ❖ Management tool
 - ❖ Farm specific data
 - ❖ Advisor
 - ❖ Guides fertiliser and manure applications
- Lack of adoption and implementation (problem)
 - ❖ Personal preference
 - ❖ Lack of perceived benefit and initial cost
 - ❖ Complexity (data heavy)
 - ❖ Socio-economic research (farm size, system, age, education etc)

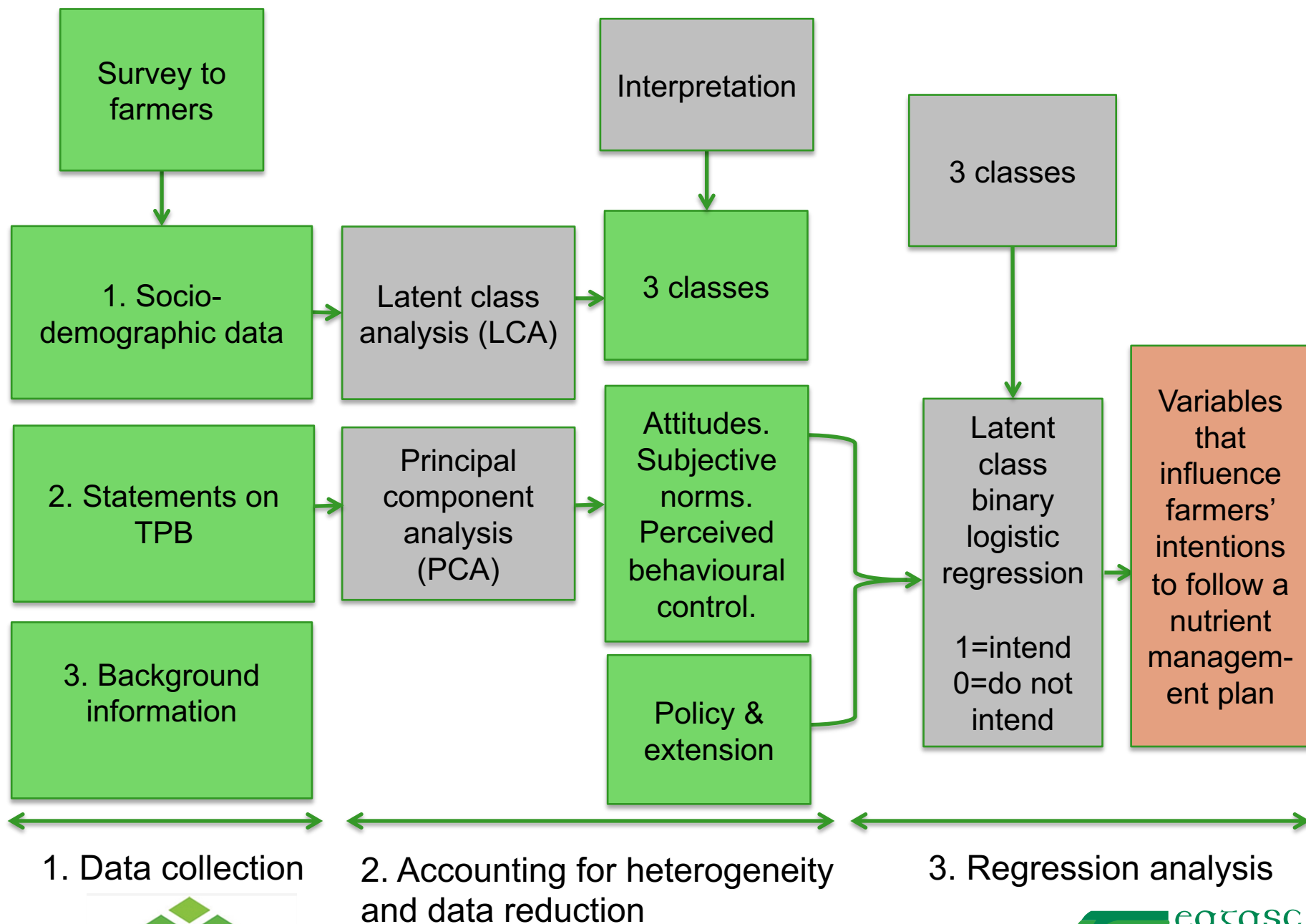


Conceptual framework

Objective: Examine which factors influence intentions to follow a nutrient management plan, whilst accounting for heterogeneity.

Theory of Planned Behaviour (TPB) (Ajzen, 1991).





Results: LCA

Class 1 (33%)

Older, uneducated, small holdings, cattle and sheep, full time, low income.

Intention: 61%



Class 2 (29%)

Younger, highly educated, small-medium holdings, cattle and sheep, part time, low-medium income.

Intention: 66%



Class 3 (38%)

Middle aged, educated, large holdings, dairy and tillage, well drained, full time, high income.

Intention: 67%



Results: factors influencing intentions

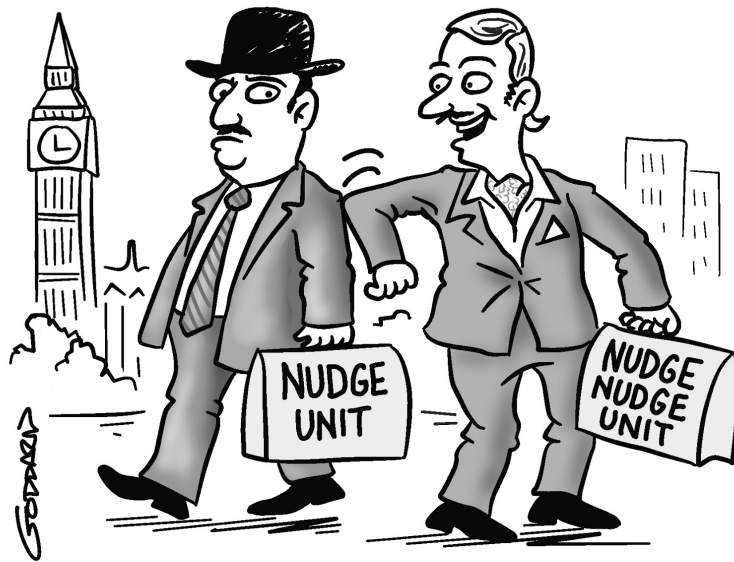
	Class 1		Class 2		Class 3	
Explanatory variables	M.effect	S.err	M.effect	S.err	M. effect	S.err
<u>TPB</u>						
Attitude	0.0297***	0.0113	-0.0247	0.0137	0.024*	0.0141
Subjective norm	0.0762***	0.0144	0.0816***	0.0170	0.0730***	0.0125
Perceived behavioural control	0.0461***	0.0149	0.0458***	0.0157	0.0947***	0.0183
<u>Additional factors</u>						
Extension contact 1 ^{ab}	0.0233	0.0531	0.0776	0.0672	-0.0276	0.0400
Extension contact 2 ^c	0.2042***	0.0760	0.1898**	0.0763	0.0068	0.0463
Policy	0.1079**	0.0452	0.2020***	0.0588	0.0953**	0.0383
Notes: *** p<0.01, ** p<0.05, * p<0.1. ^a Reference category: no extension contact. ^b Advisor only. ^c Discussion group with advisor						

Discussion

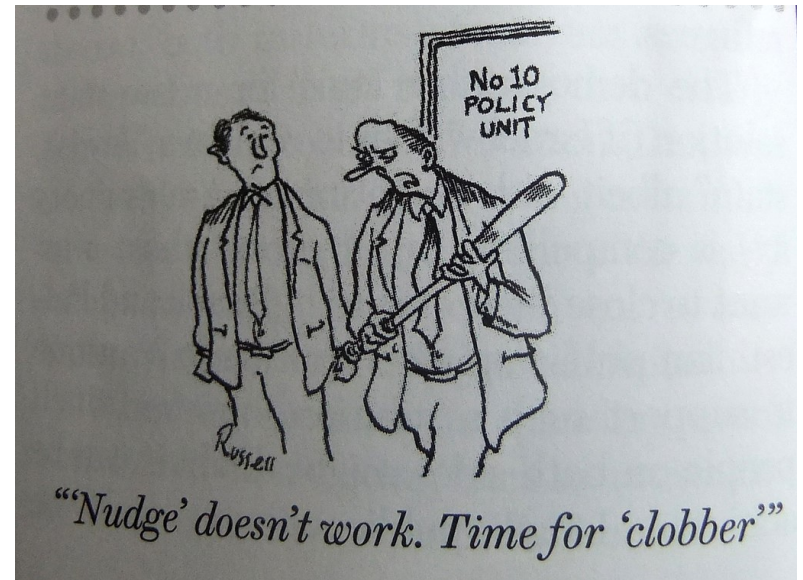
1. Nutrient management is a key pathway for supporting resource efficient & climate smart practices.
2. Intention levels are similar across classes.
3. Attitude somewhat important (Class 1 and 3).
4. Social norms most important predictor (all classes).
5. Perceived behavioural control consistent predictor (magnitude highest for Class 3).

Discussion

6. Group based extension important for Class 1 and 2.
7. Policy consistent predictor of intentions (magnitude highest for Class 2).



"Behavioural insights, eh? Say no more!"



"Nudge" doesn't work. Time for 'clobber'"

Conclusion

- **Aim:** Understand factors which influence intentions to follow a NMP whilst accounting for heterogeneity.
- **Key finding:** heterogeneity in classes and factors rather than intent.
- **Policy implications:**
 1. Lessen overall focus on highlighting benefits of NMPs but do target campaigns towards less educated and older farmers.
 2. Increase engagement with group based learning (social proof) among Class 1 and 2 types.
 3. Increase focus on provision of technical support for implementation, especially among Class 3 types.
 4. Finite resources for communication may require targeting for the 'easy wins' and increased regulatory push for the apathetic (fear).

Thank you for listening.

Questions?

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