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SAC

Optimising use of labour at lambing time for more profit and higher welfare in sheep farming

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Introduction

Financially UK hill sheep farming is only sustainable with government assistance

The economics, particularly with regard to labour, are likely to be linked to sheep welfare; however, this has not been reflected in research

Hypotheses

That: labour input in extensive sheep farming can be linked to sheep welfare and farm productivity

That: peak labour demands (lambing, gathering, shearing, …) present specific welfare challenges

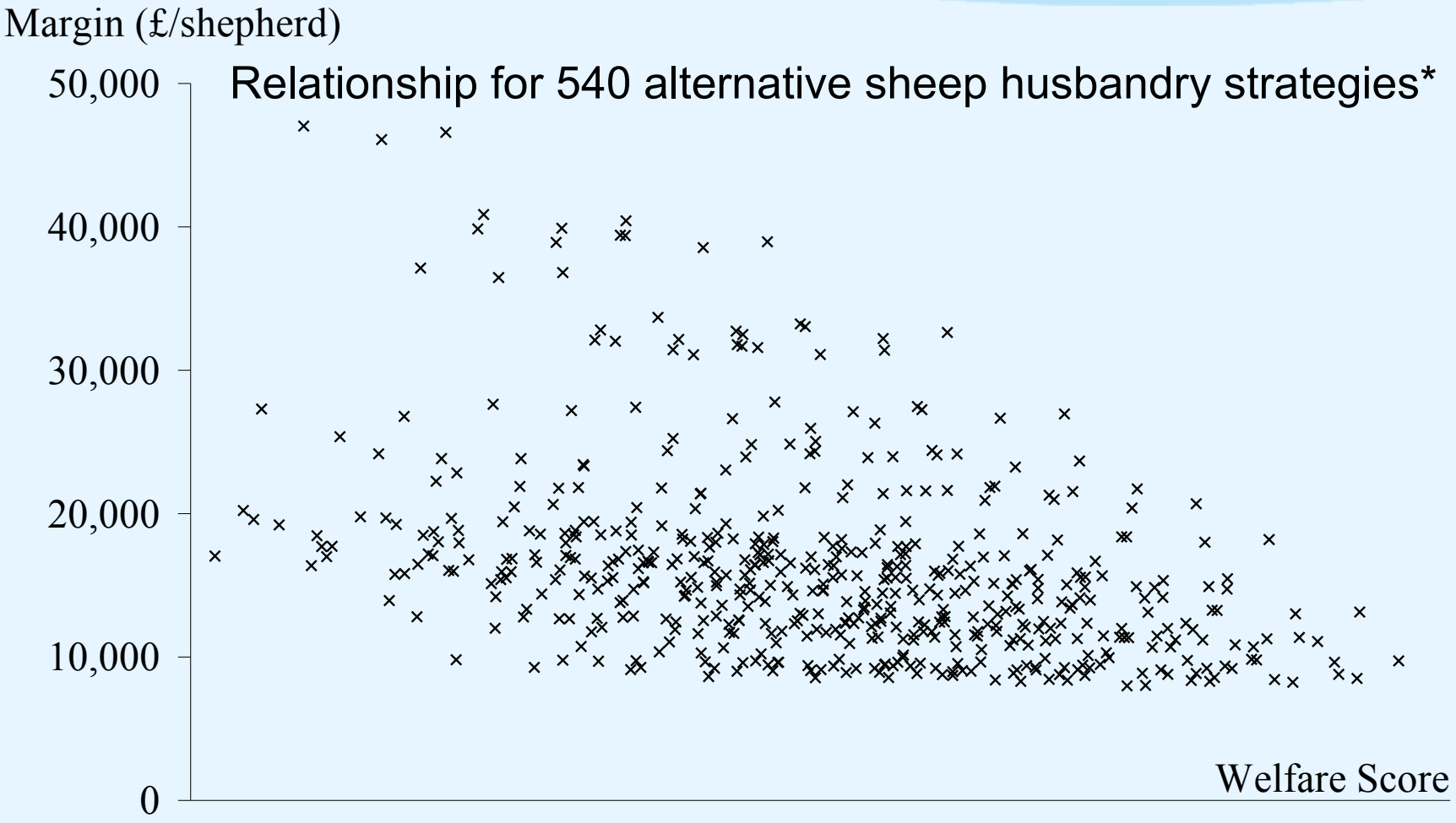
Objectives

Identify and quantify labour tasks

Construct a model to simulate labour use

Simulate farm situations under different productivity and welfare specifications

Productivity and Welfare



*Based on Stott et al. (2005) Livestock Production Science 97:161-171

Lambing fieldwork

3 pilot studies on SAC farms to identify labour tasks and estimate time used by tasks for LP model (2007)

3 visits of 10 days each to commercial extensive sheep farms (2008/2009)

Direct data recording of all tasks and labour duration for the entire working day

Results (direct data analysis)

Selected tasks and labour usage totals and shares

Task (high labour usage)	Drive	Check	Feed Sheep	Prepare Materials
Average time per day (mins)	196	166	62	41
Share of total working time	26%	22%	8%	6%

Task (low labour usage)	Lamb Ewe	Foster Lamb	Mother up Lambs	Warm Lambs
Average time per day (mins)	5	4	2	0
Share of total working time	1%	0.55%	0.25%	0%

Grouping of Tasks

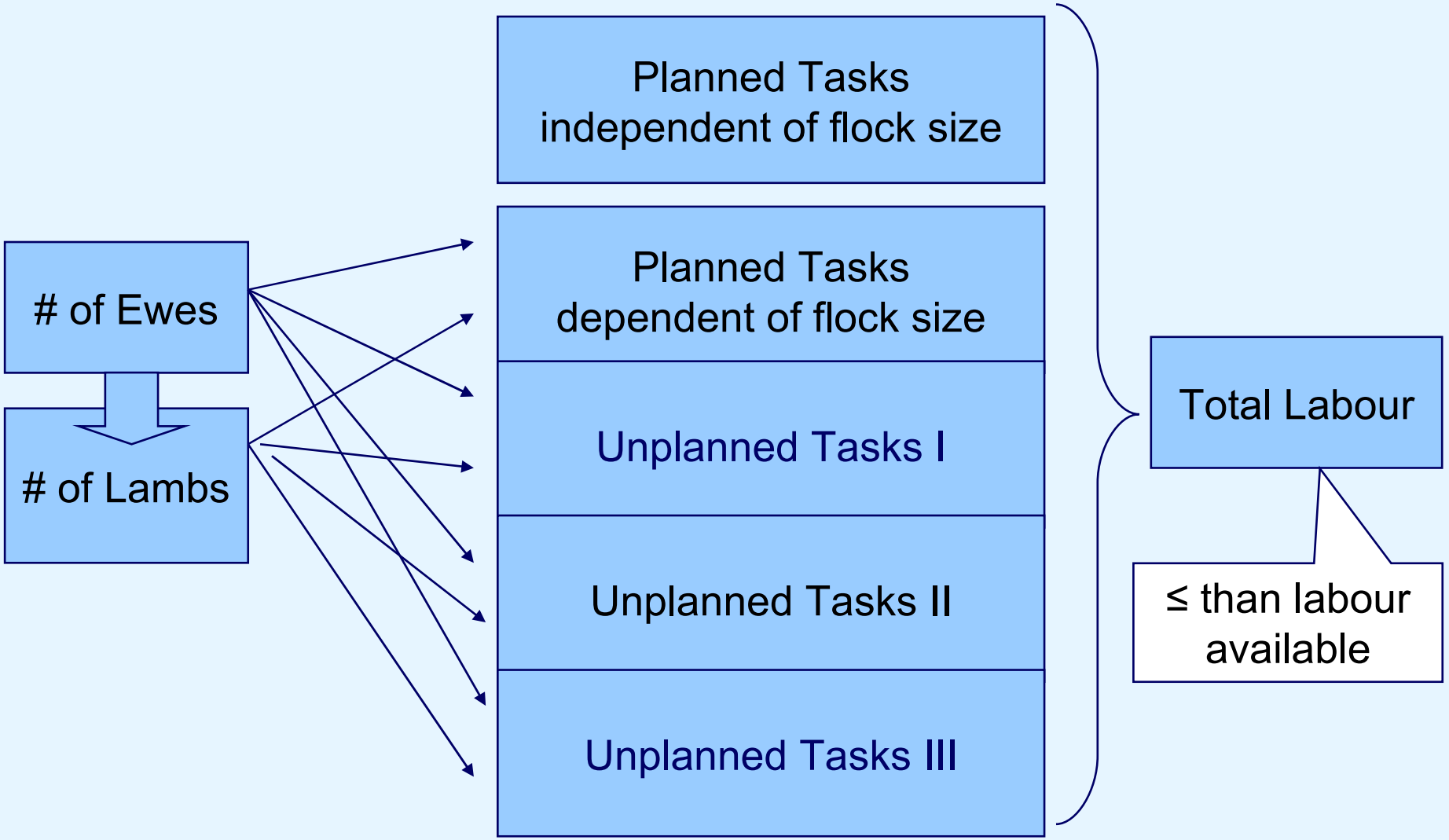
- Planned tasks with fixed labour use (e.g. drive)
- Planned tasks depended on number of sheep (e.g. feed)

- Unplanned Tasks I (almost certain loss without) (e.g lamb ewe)
- Unplanned Tasks II (potential loss without) (e.g. medical treatment lamb)
- Unplanned Tasks III (no loss without) (e.g. sort sheep)

Model inputs

Ewe numbers	Model maximises
Lamb numbers	Depend on ewe numbers
Lambing percentage	90% & 115% (reported by study farms)
Lambing duration	21 days
Lamb birth pattern	Data from SAC research farm
Tasks	Identified from field data
Labour per task	Minutes per sheep (from field data)
Labour availability	From field data (11 h/day)
Constraint	Labour use ≤ labour available

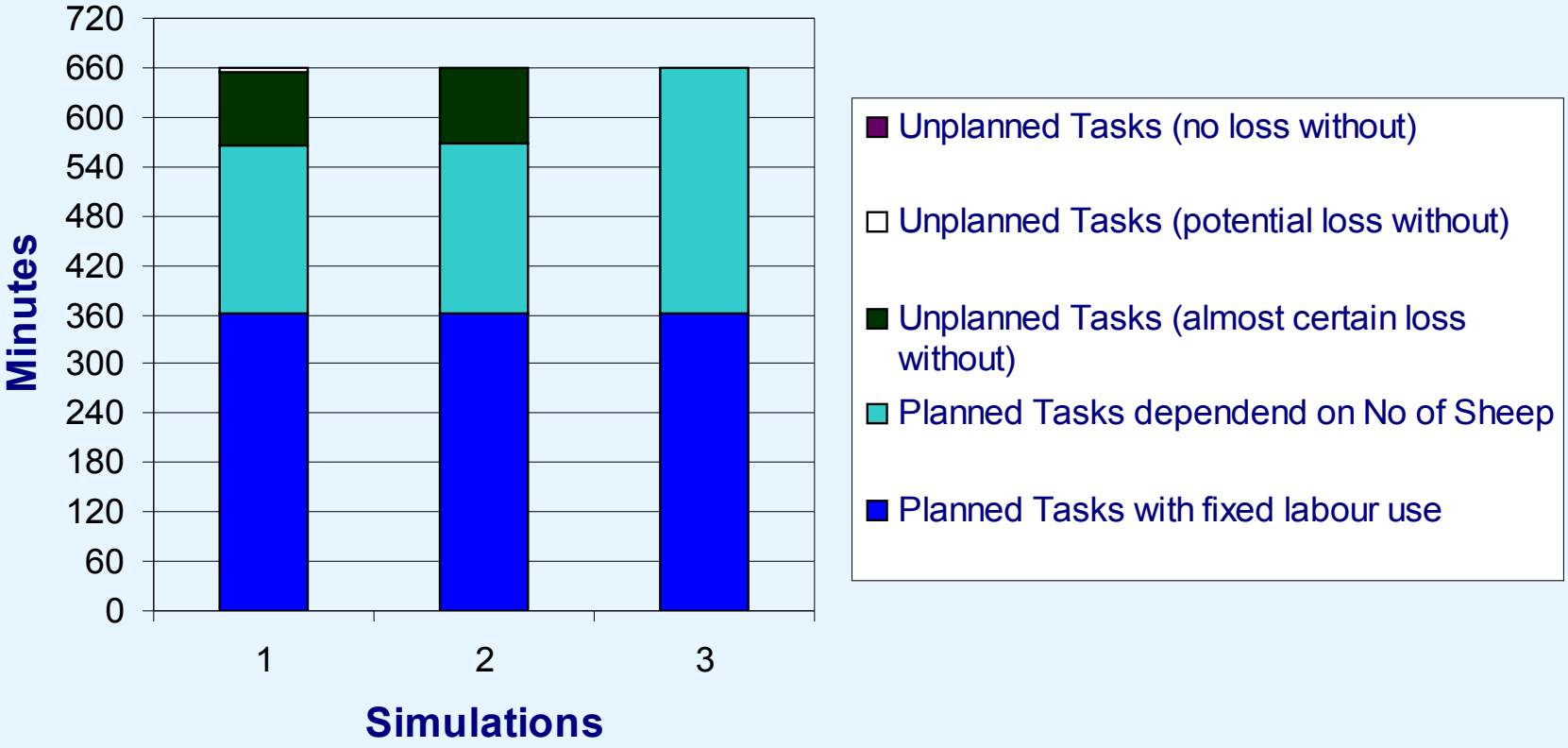
model structure



Model validation

- Validation of the model was positive for all farms
- The predicted number of ewes for the baseline runs were close to the study farms
- The maximum number of ewes per shepherd corresponded well to numbers suggested in welfare literature

Results: reduced welfare levels



Simulation 1 – labour used for all tasks (977 ewes)
Simulation 2 – labour for all tasks except unplanned/potential loss (992 ewes)
Simulation 3 – labour for all tasks except all unplanned (1428 ewes)
Thus: trade-off between labour cost and productivity/welfare

Key findings from fieldwork and modelling

- Hill sheep live to a high welfare standard, e.g. freedom to express natural behaviour, low disease rates
- Average labour input per ewe is low, even at lambing time (7 - 12 mins)
- **Farmers provide higher welfare than legally required, and more than what is economically viable**
- There is a trade-off between productivity/welfare and labour cost at lambing
- Thus, scope exists to economise labour usage

Limitations of using a LP model

- LP can capture only some differences between farms (lamb numbers, travel times, need to lamb)
- LP is suitable for small system changes, not for dramatic changes
- LP identifies the most economical use of labour, but stakeholder attitudes may differ on the optimum

Outlook/Discussion

The most practical ways forward for hill sheep farming?

- Market hill sheep as "*high welfare*"?
- Or just fine-tune the existing system?
- Accept reduced welfare as a consequence of labour pressures?
- Reduce shepherding to the legal minimum (large time savings)?

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See : www.sac.ac.uk/sheepwelfare