

WILLINGNESS OF FARMERS TO ENGAGE WITH RIPARIAN BUFFER ZONES ACROSS SMALL SCALE CATCHMENT AREAS IN THE REPUBLIC OF IRELAND



Cathal Buckley¹, Stephen Hynes², Sarah Mechan¹

¹*Agricultural Catchments Programme, Teagasc*

²*SEMRU, National University of Ireland, Galway*

Background

- Source reduction and **source interception** are the two principle strategies of abating diffuse pollution from agriculture
- Source interception – Intercept along pathway after mobilisation
- Riparian Buffer Zone
 - Vegetative strips of land which extend along the side of a watercourse
 - Goal of excluding nutrients, sediment and other organic matter from entering a watercourse

Benefits of Riparian Buffer Zones

- Reduce sediment, pathogens, and nutrient loads into a watercourse
 - Bank side stability & river ecology (plus other ecosystem services)
- Downsides
 - Pollution swapping
 - Hydrological bypassing

(Heathwaite et al., 1998; Line et al., 2000; Beltman et al., 2002; Reed & Carpenter, 2002; McKergow et al., 2003; Sharply et al., 2003; Polyakov et al., 2005, Young & Briggs, 2005; Cors & Tychon, 2007; Haygarth et al., 2009; Wilcock et al., 2009)

Willingness of farmers to adopt ?

- Adoption - Supply side analysis
 - Landowners preferences
 - Economics incentives
- Factors which influence Riparian Buffer Zone supply
 - Economics incentives
 - Environmental and social values
 - Farm and socio-demographic variables
 - Conditions of implementation
 - Experience with agri-environment schemes

(Lynch et al., 2001; Ducros & Watson, 2002; Rhodes et al., 2002; Ryan et al, 2003; Kabii & Horowitz, 2006; Ghazalian et al., 2009; Mante & Gerowitt, 2009; Patrick & Barclay, 2009; Christensen et al., 2011; Yu & Belcher, 2011)

Riparian Buffer Zone scenario

- Attitude survey
 - 12 Catchments: N=247 (Land beside water)
 - Average Catchment size = 800-1200 hectares
 - Attitudes, farm practises, socio-demographics and willing to adopt a riparian buffer zone.
- If a 5 year scheme was introduced → 10 metres fenced buffer zone, capital cost covered. Participation?

A = I would not participate in such a scheme

B = I would participate in the scheme on free-of-charge basis

C = I would participate if I was provided with an appropriate financial incentive



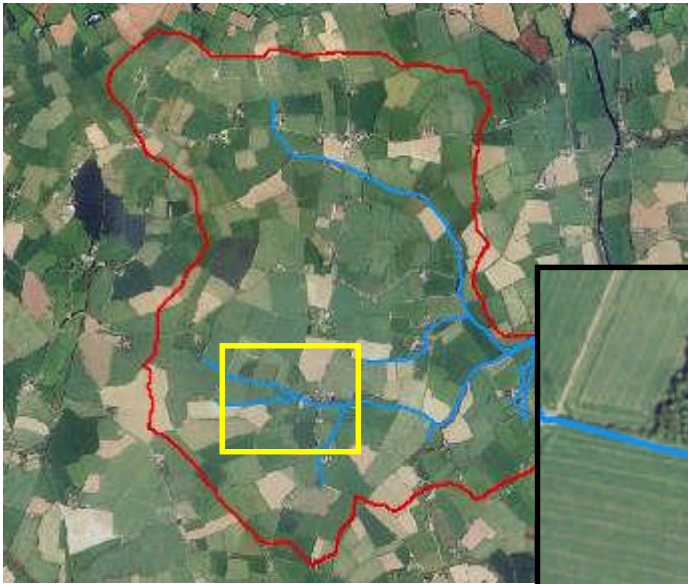
Buffer Zones – Willingness to adopt

Decision	N	%
Would not participate	132	53
Participate free of charge	17	7
Participate only with appropriate financial incentive	98	40
Total	247	100

Rationale - Not willing to adopt

Reason	N	%
Interference with farming system / loss of production	75	57
Nuisance	26	20
Buffer zone too large	20	15
Other	11	8
Total	132	100

Field Structures



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Attitude and Peers Factors

- Principal Component Analysis
 - Mathematical procedure that transforms a number of possibly correlated variables into a smaller number of uncorrelated variables called principal components or factors
- Attitude Factors
 - Environmental protection
 - Production & resource maximisation
 - Bureaucratic load
- Peer Factors
 - Regulators
 - Other farmers

Probit Model: Willingness to adopt

Agri-environment scheme history	0.514*** (0.168)
Environmental protection attitude	0.188** (0.086)
Regulators – peer influence	0.167* (0.092)
Gross margin ha ⁻¹	-0.028** (0.014)
Constant	-0.081 (0.151)
Observations (N)	248

(*** p<0.01, ** p<0.05, * p<0.1)

Compensation – What is the farmers price?

- Price demanded by those willing to adopt
 - 98 landowners (40% of the sample) want payment
 - 17 farmers (7%) willing to adopt on a free of charge basis
- Hypothetical scenario
 - Contingent valuation methodology
 - Non-market valuation
 - Validity – Direct use values
 - Estimating farmers marginal WTA in € ha⁻¹ for change of land use from agricultural production to an environmental public good → Riparian Buffer Zone

Level of payment offered

- Bids developed from:
 - Teagasc NFS (FADN based)
 - Questionnaire pilot phase
- Generalized Tobit model
(*Daniels et al., 2005; Hynes & Hanley, 2009*)
 - Point estimates (WTA for free = €0 per ha⁻¹)
 - Intervals (€501-800 per ha⁻¹)
 - Right truncation (>€2500 ha⁻¹)

€1 - 300 per ha ⁻¹ equivalent
€301 - 500 per ha ⁻¹ equivalent
€501 - 800 per ha ⁻¹ equivalent
€801 - 1200 per ha ⁻¹ equivalent
€1201 - 1800 per ha ⁻¹ equivalent
€1801 - 2500 per ha ⁻¹ equivalent
> €2500 per ha ⁻¹ equivalent

Willingness to Accept Model – Payment Level

Bureaucratic load	195.0** (88.58)
Financial planning	596.2** (240.7)
Dairy	646.6* (357.8)
Cereal crops	-636.8** (253.6)
Constant	1341*** (178.0)
Observations (** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$)	102

• **Mean WTA = €1513 ha⁻¹ → €1.51 per linear metre**

Conclusion & Discussion

- Acceptability of a Riparian Buffer Zone Scheme / Policy
 - Farmers are split nearly 47/53 on adoption
 - Not a lot of spatial continuity
 - Average cost = €1513 Ha⁻¹ or €1.51 per linear metre
- Targeting of instrument
 - Catchment hydrology
 - Critical source areas
 - Least cost marginal abatement
 - Linking of biophysical and economic

Thank you

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www.teagasc.ie/agcatchments