

Appendix

Nominal Regression

Case Processing Summary

		N	Marginal Percentage
7.5 Status of Erosion Occurrence(1=Low, 2= Medium, 3= High)	Low	51	51.0%
	Medium	41	41.0%
	High	8	8.0%
1.5 Education of HH (1=Primary, 2= Secondary, 3= High School, 4= University)	Primary	66	66.0%
	secondary	23	23.0%
	High School	8	8.0%
	University	3	3.0%
1.7 Agri. Training (0= No, 1=yes)	No	80	80.0%
	Yes	20	20.0%
2.2 Type of land (1= Forest Land, 2= Grazing & barrenLand, 3= Agri. Land)	Forest Land	23	23.0%
	Grazing & Barren Land	1	1.0%
	Agri_Land	76	76.0%
3.2 Type of soil (1=Sandy, 2= Sandy Loam, 3= Clay, 4=Silt)	Sandy	37	37.0%
	Sandy Loam	49	49.0%
	Clay	10	10.0%
	Silt	4	4.0%
5.1 Cropping System (1=Mono, 2= Mixed)	Mono	37	37.0%
	Mixed	63	63.0%
5.3 Type of Crop Management (1= Weeding, 2= Rotation, 3=FYM, 4= Compost, 5= Weeding & Rotation)	Weeding	13	13.0%
	Rotation	13	13.0%
	FYM	1	1.0%
	Compost	1	1.0%
	Weeding & Rotation	72	72.0%

7.1 Farmers' Ranking Factors on Erosion (1=Not specified, 2=Heavy Rain, 3=Slope, 4=Soil Type, 5= Deforestation, 6=Wind)	Not specified	4	4.0%
	Heavy Rain	57	57.0%
	Slope	18	18.0%
	Soil Type	6	6.0%
	Deforestation	13	13.0%
	Wind	2	2.0%
7.4 Type of Erosion (1= Not specified, 2= Rill, 3= sheet, 4= Gully, 5=Wind)	Not specified	32	32.0%
	Rill	19	19.0%
	Sheet	19	19.0%
	Gully	29	29.0%
	Wind	1	1.0%
7.6 General Topography of Land (1= Flat, 2= Rolling, 3= Hilly)	Flat	37	37.0%
	Rolling	49	49.0%
	Hilly	14	14.0%
7.7 Occurrence of Soil Color Changes in Field (0=No, 1= Yes)	No	41	41.0%
	Yes	59	59.0%
7.8 Occurrence of stones & pebbles in Field (0= No, 1= Yes)	No	36	36.0%
	Yes	64	64.0%
Valid		100	100.0%
Missing		0	
Total		100	
Subpopulation		96(a)	

a The dependent variable has only one value observed in 95 (99.0%) subpopulations.

Model Fitting Information

Model	Model Fitting Criteria -2 Log Likelihood	Likelihood Ratio Tests		
		Chi-Square	df	Sig.
Intercept Only	180.818			
Final	52.826	127.992	54	.000

Goodness-of-Fit

	Chi-Square	df	Sig.
Pearson	91.039	136	.999
Deviance	51.439	136	1.000

Pseudo R-Square

Cox and Snell	.722
Nagelkerke	.861
McFadden	.702

Likelihood Ratio Tests

Effect	Model Fitting Criteria -2 Log Likelihood of Reduced Model	Likelihood Ratio Tests		
		Chi-Square	df	Sig.
Intercept	52.826(a)	.000	0	.
EDU	85.245	32.419	6	.000
AgT	54.528(b)	1.702	2	.427
TOL	70.392(b)	17.567	4	.001
TOS	64.645(b)	11.819	6	.066
CS	61.516(b)	8.690	2	.013
TCM	53.911(b)	1.086	8	.998
FRFE	73.736(b)	20.910	10	.022
TOE	69.165	16.339	8	.038
GTL	92.113(b)	39.288	4	.000
OSC	69.190(b)	16.364	2	.000
OSP	64.898(b)	12.073	2	.002

The chi-square statistic is the difference in -2 log-likelihoods between the final model and a reduced model. The reduced model is formed by omitting an effect from the final model. The null hypothesis is that all parameters of that effect are 0.

a This reduced model is equivalent to the final model because omitting the effect does not increase the degrees of freedom.

b Unexpected singularities in the Hessian matrix are encountered. This indicates that either some predictor variables should be excluded or some categories should be merged.

Parameter Estimates

7.5 Status of Erosion Occurrence (1=Low, 2= Medium, 3= High)(a)		B	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
								Lower Bound	Upper Bound
Low	Intercept	64.474	5827.307	.000	1	.991			
	[EDU=1]	27.922	3445.694	.000	1	.994	1338394775981.677	.000	(b)
	[EDU=2]	29.042	3445.695	.000	1	.993	4098689410816.460	.000	(b)
	[EDU=3]	112.716	4056.056	.001	1	.978	8.955E+048	.000	(b)
	[EDU=4]	0(c)	.	.	0	.	.	.	.
	[AgT=0]	-29.656	1554.509	.000	1	.985	1.32E-013	.000	(b)
	[AgT=1]	0(c)	.	.	0	.	.	.	.
	[TOL=1]	39.513	2081.841	.000	1	.985	144598056334017200.000	.000	(b)
	[TOL=2]	-37.159	8231.633	.000	1	.996	7.28E-017	.000	(b)
	[TOL=3]	0(c)	.	.	0	.	.	.	.
	[TOS=1]	-36.344	3103.028	.000	1	.991	1.64E-016	.000	(b)
	[TOS=2]	-34.492	3103.030	.000	1	.991	1.05E-015	.000	(b)
	[TOS=3]	-38.055	3424.910	.000	1	.991	2.97E-017	.000	(b)
	[TOS=4]	0(c)	.	.	0	.	.	.	.
	[CS=1]	9.097	328.805	.001	1	.978	8932.796	1.18E-276	6.759E+283
	[CS=2]	0(c)	.	.	0	.	.	.	.
	[TCM=1]	-1.240	2297.910	.000	1	1.000	.289	.000	(b)
	[TCM=2]	-8.457	1337.165	.000	1	.995	.000	.000	(b)
	[TCM=3]	5.070	6712.634	.000	1	.999	159.135	.000	(b)
	[TCM=4]	-65.704	7337.579	.000	1	.993	2.92E-029	.000	(b)
	[TCM=5]	0(c)	.	.	0	.	.	.	.
	[FRFE=1]	9.449	4750.029	.000	1	.998	12690.783	.000	(b)
	[FRFE=2]	6.132	3744.965	.000	1	.999	460.397	.000	(b)
	[FRFE=3]	26.739	3682.533	.000	1	.994	409975723302.788	.000	(b)
	[FRFE=4]	-62.122	3853.338	.000	1	.987	1.05E-027	.000	(b)
	[FRFE=5]	8.009	3944.672	.000	1	.998	3007.232	.000	(b)
	[FRFE=6]	0(c)	.	.	0	.	.	.	.
	[TOE=1]	-26.643	2815.556	.000	1	.992	2.69E-012	.000	(b)
	[TOE=2]	-23.239	3033.091	.000	1	.994	8.08E-011	.000	(b)
	[TOE=3]	-53.903	2823.359	.000	1	.985	3.89E-024	.000	(b)
	[TOE=4]	-14.245	2707.726	.000	1	.996	6.51E-007	.000	(b)
	[TOE=5]	0(e)	.	.	0	.	.	.	.
	[GTL=1]	44.644	1286.162	.001	1	.972	24463305028529080000.000	.000	(b)
	[GTL=2]	.277	1522.024	.000	1	1.000	1.319	.000	(b)
	[GTL=3]	0(c)	.	.	0	.	.	.	.
	[OSC=0]	-40.197	774.895	.003	1	.959	3.49E-018	.000	(b)
	[OSC=1]	0(c)	.	.	0	.	.	.	.
	[OSP=0]	29.874	824.928	.001	1	.971	9418837295296.220	.000	(b)
	[OSP=1]	0(c)	.	.	0	.	.	.	.

Medium	Intercept	26.496	5272.041	.000	1	.996				
	[EDU=1]	26.831	3445.693	.000	1	.994	449509998567.6 16	.000		.(b)
	[EDU=2]	26.697	3445.694	.000	1	.994	393029519310.8 15	.000		.(b)
	[EDU=3]	91.814	4140.509	.000	1	.982	74869574390906 3000000000000 000000000000	.000		.(b)
	[EDU=4]	0(c)	.	.	0	.	.	.	.	.
	[AgT=0]	-28.072	1554.508	.000	1	.986	6.43E-013	.000		.(b)
	[AgT=1]	0(c)	.	.	0	.	.	.	.	.
	[TOL=1]	33.807	2081.841	.000	1	.987	48123484183113 0.000	.000		.(b)
	[TOL=2]	-20.089	7668.079	.000	1	.998	1.89E-009	.000		.(b)
	[TOL=3]	0(c)	.	.	0	.	.	.	.	.
	[TOS=1]	-16.608	3338.538	.000	1	.996	6.13E-008	.000		.(b)
	[TOS=2]	-16.801	3338.540	.000	1	.996	5.05E-008	.000		.(b)
	[TOS=3]	-24.498	3639.651	.000	1	.995	2.29E-011	.000		.(b)
	[TOS=4]	0(c)	.	.	0	.	.	.	.	.
	[CS=1]	12.148	328.803	.001	1	.971	188712.937	2.50E-275		1.424E+285
	[CS=2]	0(c)	.	.	0	.	.	.	.	.
	[TCM=1]	-.333	2297.909	.000	1	1.000	.717	.000		.(b)
	[TCM=2]	-9.225	1337.165	.000	1	.994	9.86E-005	.000		.(b)
	[TCM=3]	-10.467	7333.025	.000	1	.999	2.84E-005	.000		.(b)
	[TCM=4]	-62.681	8074.635	.000	1	.994	6.00E-028	.000		.(b)
	[TCM=5]	0(c)	.	.	0	.	.	.	.	.
	[FRFE=1]	-5.047	5020.820	.000	1	.999	.006	.000		.(b)
	[FRFE=2]	7.766	3744.964	.000	1	.998	2359.149	.000		.(b)
	[FRFE=3]	27.204	3682.532	.000	1	.994	652684639472.4 38	.000		.(b)
	[FRFE=4]	-66.957	3853.338	.000	1	.988	1.84E-025	.000		.(b)
	[FRFE=5]	7.690	3944.671	.000	1	.998	2185.780	.000		.(b)
	[FRFE=6]	0(c)	.	.	0	.	.	.	.	.
	[TOE=1]	-2.373	910.024	.000	1	.998	.093	.000		.(b)
	[TOE=2]	.770	1523.410	.000	1	1.000	2.159	.000		.(b)
	[TOE=3]	-30.152	850.662	.001	1	.972	8.04E-014	.000		.(b)
	[TOE=4]	8.006	.000	.	1	.	2998.154	2998.154		2998.154
	[TOE=5]	0(c)	.	.	0	.	.	.	.	.
	[GTL=1]	37.796	1286.161	.001	1	.977	25968433181002 840.000	.000		.(b)
	[GTL=2]	-2.051	1522.023	.000	1	.999	.129	.000		.(b)
	[GTL=3]	0(c)	.	.	0	.	.	.	.	.
	[OSC=0]	-37.248	774.894	.002	1	.962	6.66E-017	.000		.(b)
	[OSC=1]	0(c)	.	.	0	.	.	.	.	.
	[OSP=0]	25.293	824.927	.001	1	.976	96507827709.97 2	.000		.(b)
	[OSP=1]	0(c)	.	.	0	.	.	.	.	.

- a The reference category is: High.
 b Floating point overflow occurred while computing this statistic. Its value is therefore set to system missing.
 c This parameter is set to zero because it is redundant.

Classification

Observed	Predicted			Percent Correct
	Low	Medium	High	
Low	46	5	0	90.2%
Medium	5	35	1	85.4%
High	0	0	8	100.0%
Overall Percentage	51.0%	40.0%	9.0%	89.0%

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Questionnaire

General information

Name of informant.....Village Tract/ Village.....
 Township.....Household number.....
 Name of Interviewer.....Date

Socio-economic status

10 Farm household characteristics

1.1 Household size and labor source

Question 1: Could you please give information about your household?

No.	Member Name	Age	Sex	Ethnic	Marital status	Education	Occupation	Remark
1								
2								
3								
4								
5								
6								
7								
8								

Question 2: Has any member of this household ever attended farmer training/ demonstration on land management practice? Fertilizer management practice?

Yes/ No If yes please specify type of trainings;

Type of training	Year	Remark

Question 3: Farm labor availability trend in last 5- 10 years *Tick one option only*

1. Increase	2. Decrease	3. Constant
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2 Income sources

Question 4: How many growing area or acre do you have?

Question 5: Could you please give information about income from your agricultural production?

2.1 Receives

Crops (2006-07)

Crops	Plot	Area/plot	Total area	Number of harvest	Basket	Total output	Yield
Paddy							
Sesame							
Groundnut							
Millet							
Maize							
Corn							
Sunflower							
Bean & pulses							
Toddy							
Sorghum							
Onion							
Garlic							
L. S. Cotton							
S. S. Cotton							
Chili							
Potato							
Sugarcane							
Beetle							
Banana							
Coconut							
Other							

Crops	Total consumption	Total selling (Basket)	Price Kyats/ Basket	Total income (Kyats)

Question 6: Could you please give information about income from livestock?

Livestock (2006-07)

Livestock	No. of livestock	No. of harvest	Total selling	Price/ Head	Total income	Total consumption
Goat						
Sheep						
Pig						
Cattle						
Poultry						

Question 7: Could you please give information about income from non-agricultural activities?

Non-agricultural activities

Type	Quantity	Value (Kyat)	Total (Kyat)
Non timber forest products			
Industry			
Other			

2.2 Expenses

Question 8: Could you give information about your expense?

Type	Quantity	Price (Kyat)	Total expense (Kyat)
Seed (Basket)			
Fertilizers (kg)			
Pesticides (liter)			
Labor			
Irrigation			
Food			
Clothes			
Education			
Social welfare fee			
Other			

Question 9: What type of livestock your household managing at present? *Tick one option only*

Type of livestock	A. Tick if manage	B. Trend of livestock no.		
		At present (Head)	5 years before (Head)	10 years before (Head)
Goat				
Sheep				
Cattle				
Pig				
Other				

Land use management characteristics

1. Land use

1.1 Crops

Question 10: Could you please give information about the crops you grow before?

No.	Crops of 5 years ago	Crops of 10 years ago	Crops of 15 years ago
1			
2			
3			
4			

Question 11: Could you please give information about current crops and the reason of growing?

No.	Crops	Season	Planting date	Harvesting date	Variety	Reason
	Paddy					
	Sesame					
	Groundnut					
	Millet					
	Maize					
	Sunflower					
	Bean & pulses					
	Tobacco					
	Other					

2. Land tenure system

Question 14: What type of land are you holding?

Type	Size (acre)	Duration held (Year)	Duration will hold (Year)	Ownership
Agricultural				
Forestry				
Grazing				
Other				

3. Fertilizer application

Question 15: Do you use fertilizer for crops?

Crops	Type	Frequency (time/crop)	Total amount (kg)	Average quantity (kg/ac/season)	Quality	Source supply	Available

Status of Trend of using fertilizer amount

Fertilizer type	Increase	Decrease	Constant
Urea			
Ammonium sulphate			
Phosphorus			

Question 16: How is your fertilizer application method?

.....

Asking farmers to assess fertility of his field. *Tick one option only*

1. Poorly fertile	2. Moderately fertile	3. Highly fertile
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4. Other technical issues of farming systems

Question 17: What kind of land preparation did you use in the field?

Crops	Land preparation method				
	Hoe using	Plow with cattle	Plough with tractor	No. of application	Other
Paddy					
Sesame					
Groundnut					
Sunflower					

Question 18: How often did you use methods of land preparation (time/ crop)?

Question 19: Trend of changing number of tillage operation.

1. Increase	2. Decrease	3. Constant
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Question 20: What do you usually do for crop management? (weed, pest control or crop rotation)?

5. Water use situation (rainfed/ irrigated) If irrigated please specify as follow:

Crop	Type of irrigation				No. of application
	Surface	Dripping	Sprinkler	Other	
Paddy					
Sesame					
Groundnut					
Sunflower					

Soil conservation management

1. Crop residues management

Question 21: How do you use crop residues?

Type of crop	% burn	Plant left on the field		% for livestock feeds	% for home use
		Part of plants	%		
Paddy					
Sesame					
Groundnut					
Sunflower					

2. Experience & knowledge of farmers on soil conservation

2.1 Factor affecting soil erosion

Question: 22: What factors is the most important cause soil erosion? Why?

Factors	Farmer ranking	Reasons
Deforestation		
Slash & burn practices		
Soil type		
Heavy Rain		
Temperature		
Slope steepness		
Continuous cultivation		
Other		

2.2 Crops

Question 23: What types of crops are good adapted to soil? Why?

Types of crop	Farmer ranking	Reason
Paddy		
Sesame		
Groundnut		
Sunflower		

2.3 Cropping systems

Question 24: What type of cropping systems do you think good for soil? Why?

Cropping system	Farmer ranking	Reasons
Mono cropping		
Inter cropping		
Multiple cropping		
Crop rotation		
Agro forestry		

3. Farmer problems

Question 25: What problems do you have in land and agricultural production?

.....

Question 26: Could you please give some suggestion for soil erosion control practices in this area?

.....

Question 27: If yes, which way?

.....

Question 28: What are the constraints for increase agricultural production?

- 1).....
- 2).....
- 3).....

Soil & Erosion Status

1. Soil Status

1.1. Soil texture

Question 29: Could you tell me about soil status of your field?

Type of soil				
Sand				
Sandy loam				
Loam				
Silt loam				
Clay loam				
Silt clay, clay				
Heavy clay				

1.2. Soil problem

Type of problem	Tick	Remark
Salinity		
Alkalinity		
Acidity		
Water logged		
Poor infiltration		

1.4 Soil Depth

Level of depth	15 Years before	10 Years before	5 Years before
> 150 cm			
100-150 cm			
50-100 cm			
25-50 cm			
< 25 cm			

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2. Erosion status

2.1 Erosion form

Question 30: Have you ever seen any type of erosion form in your field? If yes please specify as follow.

Type of erosion	Number of observation	Depth (cm/in)	Length (cm/in)	Width (cm/in)	Year
Rill					
Sheet					
Gully					
Other					

Question 31: Asking about past erosion

1. Slight	2. Moderate	3. Severe
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Question 32: Could you explain about your land's general topography?

1. Flat	2. Rolling	3. Hilly
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Morphology	Shape	Length	%	Other remark
Slope				

1. Vegetation

Type	Cover (%)	Area (acre)		
Natural				
Crop				
Fallow				

Question 33: Have you ever seen any changes in colour in higher and convex portions of your field?

Question 34: Have you ever seen increase number of stones and pebbles in your field?

Question 35: Source of your family energy (forest product or others).

Question 36: Kind of livestock feeds (straw, maize stalk,).

CURRICULUM VITAE

Name Zaw Wan

Date of birth June 21, 1971

Educational Background:

1993-1996 Bachelor of Agricultural Science (B.Agr.Sc.), Yezin Agricultural University (YAU), Myanmar

2000-2002 Diploma in Computer Science (D.C.Sc.), University of Computer Studies, Yangon, Myanmar

2006-2008 Master of Science (Agriculture) in Agricultural Systems, Chiang Mai University, Chiang Mai, Thailand

Scholarships: Thailand International Development Cooperation Agency (TICA), Thailand; 2006-2008

Working experiences

1997-2002 Deputy Planning Officer, Department of Agricultural Planning, Ministry of Agriculture and Irrigation (MOAI), Yangon, Myanmar

2002- Present Assistant Manager, Myanmar Perennial Crops Enterprise, MOAI, Myanmar

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