APPENDIX

APPENDIX A

Results of Logit Estimations for Green Practice Adoptions of Highland Farmers

A1. Farmers' adoption on green production

```
+---------------------------------------------+
| Binary Logit Model for Binary Choice        |
| Maximum Likelihood Estimates                |
| Model estimated: Nov 10, 2016 at 08:55:28PM.|
| Dependent variable                  GPA     |
| Weighting variable                  None    |
| Number of observations               188    |
| Iterations completed                   7    |
| Log likelihood function       -71.28006     |
| Number of parameters                   8    |
| Info. Criterion: AIC =            .84340    |
|   Finite Sample: AIC =            .84768    |
| Info. Criterion: BIC =            .98113    |
| Info. Criterion:HQIC =            .89920    |
| Restricted log likelihood     -130.2159     |
| McFadden Pseudo R-squared      .4526010     |
| Chi squared                   117.8717     |
| Degrees of freedom                     7    |
| Prob[ChiSqd > value] =         .0000000    |
| Hosmer-Lemeshow chi-squared =   7.96049     |
| P-value=  .33609 with deg.fr. =        7    |
+---------------------------------------------+
+--------+-------------+----------------+--------+--------+----------+
|Variable| Coefficient | Standard Error |b/St.Er.|P[|Z|>z]| Mean of X|
+--------+-------------+----------------+--------+--------+----------+
---------+Characteristics in numerator of Prob[Y = 1]
 Constant|   -10.0977673     1.69055008    -5.973   .0000
 GEN     |     .10244474      .43098223      .238   .8121    .61170213
 EDU     |     .41622446      .10704873     3.888   .0001   8.62765957
 EXP     |     .12937396      .05835079     2.217   .0266   11.3936170
 ATT     |     .00407428      .02422300      .168   .8664   30.0106383
 FS      |    -.00776758      .03133540     -.248   .8042   8.84840426
 CI      |    2.56309387      .64219435     3.991   .0001    .73404255
 IA      |    1.03764961      .22102463     4.695   .0000   2.80319149

+-----------------------------------------------------------------------+
| Information Statistics for Discrete Choice Model.                     |
|                          M=Model MC=Constants Only   M0=No Model      |
| Criterion F (log L)      -71.28006       -130.21591    -130.31167     |
| LR Statistic vs. MC      117.87169           .00000        .00000     |
| Degrees of Freedom         7.00000           .00000        .00000     |
| Prob. Value for LR          .00000           .00000        .00000     |
| Entropy for probs.        71.28006         130.21591     130.31167     |
| Normalized Entropy          .54700           .99927       1.00000     |
| Entropy Ratio Stat.      118.06321           .19152        .00000     |
| Bayes Info Criterion        .95327          1.58025       1.58127     |
| BIC(no model) - BIC         .62800           .00102        .00000     |
| Pseudo R-squared            .45260           .00000        .00000     |
| Pct. Correct Pred.        82.97872           .00000      50.00000     |
| Means:       y=0    y=1    y=2    y=3    y=4    y=5    y=6   y>=7     |
| Outcome     .5160  .4840  .0000  .0000  .0000  .0000  .0000  .0000     |
```

```
| Pred.Pr     .5160  .4840  .0000  .0000  .0000  .0000  .0000  .0000 |
| Notes: Entropy computed as Sum(i)Sum(j)Pfit(i,j)*logPfit(i,j).     |
|        Normalized entropy is computed against M0.                  |
|        Entropy ratio statistic is computed against M0.             |
|        BIC = 2*criterion - log(N)*degrees of freedom.              |
|        If the model has only constants or if it has no constants,  |
|        the statistics reported here are not useable.               |
+--------------------------------------------------------------------+

+-----------------------------------------+
| Partial derivatives of probabilities with |
| respect to the vector of characteristics. |
| They are computed at the means of the Xs. |
| Observations used are All Obs.          |
+-----------------------------------------+
+--------+-------------+----------------+--------+--------+----------+
|Variable| Coefficient  | Standard Error |b/St.Er.|P[|Z|>z]|Elasticity|
+--------+-------------+----------------+--------+--------+----------+
---------+Marginal effect for variable in probability
 Constant|   -2.51439653       .41803637    -6.015   .0000
---------+Marginal effect for dummy variable is P|1 - P|0.
 GEN     |     .02548454       .10710610      .238   .8119    .03327705
 EDU     |     .10364205       .02686928     3.857   .0001   1.90878480
 EXP     |     .03221479       .01457287     2.211   .0271    .78351057
 ATT     |     .00101452       .00603144      .168   .8664    .06499237
 FS      |    -.00193417       .00780271     -.248   .8042   -.03653316
---------+Marginal effect for dummy variable is P|1 - P|0.
 CI      |     .51698293       .08486201     6.092   .0000    .81007532
 IA      |     .25838015       .05512619     4.687   .0000   1.54610813

+---------------------+
| Marginal Effects for|
+----------+----------+
| Variable | All Obs. |
+----------+----------+
| ONE      | -2.51440 |
| GEN      |   .02548 |
| EDU      |   .10364 |
| EXP      |   .03221 |
| ATT      |   .00101 |
| FS       |  -.00193 |
| CI       |   .51698 |
| IA       |   .25838 |
+----------+----------+
+----------------------------------------+
| Fit Measures for Binomial Choice Model |
| Logit    model for variable GPA        |
+----------------------------------------+
| Proportions P0= .515957   P1= .484043  |
| N =     188 N0=      97   N1=      91  |
| LogL=      -71.280 LogL0=    -130.216  |
| Estrella = 1-(L/L0)^(-2L0/n) = .56601  |
+----------------------------------------+
|     Efron |  McFadden  |  Ben./Lerman  |
|    .53213 |    .45260  |       .76294  |
|    Cramer | Veall/Zim. |     Rsqrd_ML  |
|    .52540 |    .66355  |       .46580  |
+----------------------------------------+
| Information  Akaike I.C. Schwarz I.C.  |
| Criteria         .84340        .98113  |
+----------------------------------------+
```

+---+
|Predictions for Binary Choice Model. Predicted value is |
|1 when probability is greater than .500000, 0 otherwise.|
|Note, column or row total percentages may not sum to |
|100% because of rounding. Percentages are of full sample.|
+------+-----------------------------------+----------------+
|Actual| Predicted Value | |
|Value | 0   1 | Total Actual |
+------+---------------+-------------------+----------------+
| 0 | 81 (43.1%)| 16 (8.5%)| 97 (51.6%)|
| 1 | 16 (8.5%)| 75 (39.9%)| 91 (48.4%)|
+------+---------------+-------------------+----------------+
|Total | 97 (51.6%)| 91 (48.4%)| 188 (100.0%)|
+------+---------------+-------------------+----------------+

==
Analysis of Binary Choice Model Predictions Based on Threshold = .5000

Prediction Success

Sensitivity = actual 1s correctly predicted   82.418%
Specificity = actual 0s correctly predicted   83.505%
Positive predictive value = predicted 1s that were actual 1s   82.418%
Negative predictive value = predicted 0s that were actual 0s   83.505%
Correct prediction = actual 1s and 0s correctly predicted   82.979%

Prediction Failure

False pos. for true neg. = actual 0s predicted as 1s   16.495%
False neg. for true pos. = actual 1s predicted as 0s   17.582%
False pos. for predicted pos. = predicted 1s actual 0s   17.582%
False neg. for predicted neg. = predicted 0s actual 1s   16.495%
False predictions = actual 1s and 0s incorrectly predicted   17.021%
==

A2. Farmers' adoption on green waste management

```
+--------------------------------------------+
| Binary Logit Model for Binary Choice       |
| Maximum Likelihood Estimates               |
| Model estimated: Nov 10, 2016 at 08:56:00PM.|
| Dependent variable                  GWA    |
| Weighting variable                 None    |
| Number of observations              188    |
| Iterations completed                  6    |
| Log likelihood function       -89.38891    |
| Number of parameters                  8    |
| Info. Criterion: AIC =          1.03605    |
|   Finite Sample: AIC =          1.04033    |
| Info. Criterion: BIC =          1.17377    |
| Info. Criterion:HQIC =          1.09185    |
| Restricted log likelihood     -124.6265    |
| McFadden Pseudo R-squared      .2827454    |
| Chi squared                   70.47512    |
| Degrees of freedom                   7    |
| Prob[ChiSqd > value] =         .0000000    |
| Hosmer-Lemeshow chi-squared =  18.64660    |
| P-value=  .00937 with deg.fr. =      7     |
+--------------------------------------------+
+--------+-------------+----------------+-------+--------+----------+
|Variable| Coefficient | Standard Error |b/St.Er.|P[|Z|>z]| Mean of X|
+--------+-------------+----------------+-------+--------+----------+
---------+Characteristics in numerator of Prob[Y = 1]
 Constant|   -5.54443109      1.24565119    -4.451   .0000
 GEN     |     .58349622       .38080462     1.532   .1255    .61170213
 EDU     |     .13929095       .08692642     1.602   .1091   8.62765957
 EXP     |     .03047216       .04863844      .627   .5310   11.3936170
 ATT     |     .03436255       .02167724     1.585   .1129   30.0106383
 FS      |    -.02595527       .02807687     -.924   .3553   8.84840426
 CI      |    1.27231032       .42309235     3.007   .0026    .73404255
 IA      |     .95935532       .20531840     4.673   .0000   2.80319149

+---------------------------------------------------------------------+
| Information Statistics for Discrete Choice Model.                   |
|                           M=Model MC=Constants Only   M0=No Model   |
| Criterion F (log L)      -89.38891        -124.62647    -130.31167 |
| LR Statistic vs. MC       70.47512            .00000        .00000 |
| Degrees of Freedom         7.00000            .00000        .00000 |
| Prob. Value for LR          .00000            .00000        .00000 |
| Entropy for probs.        89.38891         124.62647     130.31167 |
| Normalized Entropy          .68596            .95637       1.00000 |
| Entropy Ratio Stat.       81.84553          11.37041        .00000 |
| Bayes Info Criterion       1.14592           1.52079       1.58127 |
| BIC(no model) - BIC         .43535            .06048        .00000 |
| Pseudo R-squared            .28275            .00000        .00000 |
| Pct. Correct Pred.        78.19149            .00000      50.00000 |
| Means:       y=0    y=1    y=2    y=3    y=4    y=5    y=6   y>=7 |
| Outcome     .3777  .6223  .0000  .0000  .0000  .0000  .0000  .0000 |
| Pred.Pr     .3777  .6223  .0000  .0000  .0000  .0000  .0000  .0000 |
| Notes: Entropy computed as Sum(i)Sum(j)Pfit(i,j)*logPfit(i,j).      |
|        Normalized entropy is computed against M0.                   |
|        Entropy ratio statistic is computed against M0.              |
|        BIC = 2*criterion - log(N)*degrees of freedom.               |
|        If the model has only constants or if it has no constants,   |
|        the statistics reported here are not useable.                |
+---------------------------------------------------------------------+
```

```
+-----------------------------------------+
| Partial derivatives of probabilities with |
| respect to the vector of characteristics. |
| They are computed at the means of the Xs. |
| Observations used are All Obs.          |
+-----------------------------------------+
+--------+-------------+----------------+--------+--------+----------+
|Variable| Coefficient  | Standard Error |b/St.Er.|P[|Z|>z]|Elasticity|
+--------+-------------+----------------+--------+--------+----------+
---------+Marginal effect for variable in probability
 Constant|   -1.19219220       .26840120    -4.442   .0000
---------+Marginal effect for dummy variable is P|1 - P|0.
 GEN     |     .12786148       .08388875     1.524   .1275    .11384478
 EDU     |     .02995106       .01853221     1.616   .1061    .37613054
 EXP     |     .00655228       .01044816      .627   .5306    .10866445
 ATT     |     .00738881       .00463936     1.593   .1112    .32276266
 FS      |    -.00558104       .00602856     -.926   .3546   -.07188085
---------+Marginal effect for dummy variable is P|1 - P|0.
 CI      |     .29170257       .09826105     2.969   .0030    .31166992
 IA      |     .20628553       .04178719     4.937   .0000    .84169537

+---------------------+
| Marginal Effects for|
+----------+----------+
| Variable | All Obs. |
+----------+----------+
| ONE      | -1.19219 |
| GEN      |   .12786 |
| EDU      |   .02995 |
| EXP      |   .00655 |
| ATT      |   .00739 |
| FS       |  -.00558 |
| CI       |   .29170 |
| IA       |   .20629 |
+----------+----------+
+-----------------------------------------+
| Fit Measures for Binomial Choice Model |
| Logit    model for variable GWA        |
+-----------------------------------------+
| Proportions P0= .377660   P1= .622340  |
| N =     188 N0=      71   N1=     117  |
| LogL=      -89.389 LogL0=    -124.626  |
| Estrella = 1-(L/L0)^(-2L0/n) = .35635  |
+-----------------------------------------+
|     Efron |  McFadden  |  Ben./Lerman  |
|    .34725 |    .28275  |     .69064    |
|    Cramer | Veall/Zim. |     Rsqrd_ML  |
|    .34188 |    .47831  |      .31262   |
+-----------------------------------------+
| Information  Akaike I.C. Schwarz I.C.  |
| Criteria        1.03605      1.17377   |
+-----------------------------------------+
```

+---+
|Predictions for Binary Choice Model. Predicted value is |
|1 when probability is greater than .500000, 0 otherwise.|
|Note, column or row total percentages may not sum to |
|100% because of rounding. Percentages are of full sample.|
+------+-----------------------------------+----------------+
|Actual| Predicted Value | |
|Value | 0   1 | Total Actual |
+------+---------------+-----------------+----------------+
| 0 | 49 (26.1%)| 22 (11.7%)| 71 (37.8%)|
| 1 | 19 (10.1%)| 98 (52.1%)| 117 (62.2%)|
+------+---------------+-----------------+----------------+
|Total | 68 (36.2%)| 120 (63.8%)| 188 (100.0%)|
+------+---------------+-----------------+----------------+

```
================================================================================
Analysis of Binary Choice Model Predictions Based on Threshold =  .5000
--------------------------------------------------------------------------------
Prediction Success
--------------------------------------------------------------------------------
Sensitivity = actual 1s correctly predicted                          83.761%
Specificity = actual 0s correctly predicted                          69.014%
Positive predictive value = predicted 1s that were actual 1s         81.667%
Negative predictive value = predicted 0s that were actual 0s         72.059%
Correct prediction = actual 1s and 0s correctly predicted            78.191%
--------------------------------------------------------------------------------
Prediction Failure
--------------------------------------------------------------------------------
False pos. for true neg. = actual 0s predicted as 1s                 30.986%
False neg. for true pos. = actual 1s predicted as 0s                 16.239%
False pos. for predicted pos. = predicted 1s actual 0s               18.333%
False neg. for predicted neg. = predicted 0s actual 1s               27.941%
False predictions = actual 1s and 0s incorrectly predicted           21.809%
================================================================================
```

A3. Farmers' adoption on green transportation

```
+--------------------------------------------+
| Binary Logit Model for Binary Choice       |
| Maximum Likelihood Estimates               |
| Model estimated: Nov 10, 2016 at 08:56:29PM.|
| Dependent variable                  GTA    |
| Weighting variable                 None    |
| Number of observations              188    |
| Iterations completed                  6    |
| Log likelihood function       -97.17312    |
| Number of parameters                  8    |
| Info. Criterion: AIC =          1.11886    |
|   Finite Sample: AIC =          1.12314    |
| Info. Criterion: BIC =          1.25658    |
| Info. Criterion:HQIC =          1.17466    |
| Restricted log likelihood     -130.2691    |
| McFadden Pseudo R-squared      .2540586    |
| Chi squared                   66.19199    |
| Degrees of freedom                    7    |
| Prob[ChiSqd > value] =         .0000000    |
| Hosmer-Lemeshow chi-squared =   8.68808    |
| P-value=  .36929 with deg.fr. =       8    |
+--------------------------------------------+
+--------+--------------+----------------+--------+--------+----------+
|Variable| Coefficient  | Standard Error |b/St.Er.|P[|Z|>z]| Mean of X|
+--------+--------------+----------------+--------+--------+----------+
---------+Characteristics in numerator of Prob[Y = 1]
 Constant|   -5.25509342      1.13380175    -4.635   .0000
 GEN     |     .01292872       .36122531      .036   .9714    .61170213
 EDU     |     .08501179       .07426023     1.145   .2523   8.62765957
 EXP     |     .01531583       .04220019      .363   .7167   11.3936170
 ATT     |     .03839515       .02105584     1.823   .0682   30.0106383
 FS      |    -.02126281       .02513030     -.846   .3975   8.84840426
 CI      |     .92043891       .43343807     2.124   .0337    .73404255
 IA      |     .98948850       .19107851     5.178   .0000   2.80319149

+---------------------------------------------------------------------+
| Information Statistics for Discrete Choice Model.                   |
|                           M=Model MC=Constants Only   M0=No Model   |
| Criterion F (log L)      -97.17312        -130.26911    -130.31167   |
| LR Statistic vs. MC       66.19199            .00000        .00000   |
| Degrees of Freedom         7.00000            .00000        .00000   |
| Prob. Value for LR          .00000            .00000        .00000   |
| Entropy for probs.        97.17312         130.26911     130.31167   |
| Normalized Entropy          .74570            .99967       1.00000   |
| Entropy Ratio Stat.       66.27710            .08511        .00000   |
| Bayes Info Criterion       1.22873           1.58082       1.58127   |
| BIC(no model) - BIC         .35254            .00045        .00000   |
| Pseudo R-squared            .25406            .00000        .00000   |
| Pct. Correct Pred.        74.46809            .00000      50.00000   |
| Means:       y=0    y=1    y=2    y=3    y=4    y=5    y=6   y>=7   |
| Outcome     .4894  .5106  .0000  .0000  .0000  .0000  .0000  .0000   |
| Pred.Pr     .4894  .5106  .0000  .0000  .0000  .0000  .0000  .0000   |
| Notes: Entropy computed as Sum(i)Sum(j)Pfit(i,j)*logPfit(i,j).      |
|        Normalized entropy is computed against M0.                   |
|        Entropy ratio statistic is computed against M0.              |
|        BIC = 2*criterion - log(N)*degrees of freedom.               |
|        If the model has only constants or if it has no constants,   |
|        the statistics reported here are not useable.                |
+---------------------------------------------------------------------+
```

```
+-----------------------------------------+
| Partial derivatives of probabilities with |
| respect to the vector of characteristics. |
| They are computed at the means of the Xs. |
| Observations used are All Obs.          |
+-----------------------------------------+
+--------+-------------+----------------+--------+--------+----------+
|Variable| Coefficient  | Standard Error |b/St.Er.|P[|Z|>z]|Elasticity|
+--------+-------------+----------------+--------+--------+----------+
---------+Marginal effect for variable in probability
 Constant|   -1.31196386       .28417167    -4.617   .0000
---------+Marginal effect for dummy variable is P|1 - P|0.
 GEN     |     .00322789       .09018956      .036   .9714    .00380770
 EDU     |     .02122368       .01853800     1.145   .2523    .35311633
 EXP     |     .00382368       .01053540      .363   .7167    .08401327
 ATT     |     .00958557       .00525601     1.824   .0682    .55474991
 FS      |    -.00530838       .00627313     -.846   .3974   -.09057977
---------+Marginal effect for dummy variable is P|1 - P|0.
 CI      |     .22506681       .10068835     2.235   .0254    .31859349
 IA      |     .24703141       .04759016     5.191   .0000   1.33539315

+---------------------+
| Marginal Effects for|
+----------+----------+
| Variable | All Obs. |
+----------+----------+
| ONE      | -1.31196 |
| GEN      |   .00323 |
| EDU      |   .02122 |
| EXP      |   .00382 |
| ATT      |   .00959 |
| FS       |  -.00531 |
| CI       |   .22507 |
| IA       |   .24703 |
+----------+----------+
+-----------------------------------------+
| Fit Measures for Binomial Choice Model |
| Logit    model for variable GTA        |
+-----------------------------------------+
| Proportions P0= .489362   P1= .510638  |
| N =     188 N0=      92   N1=      96  |
| LogL=      -97.173 LogL0=    -130.269  |
| Estrella = 1-(L/L0)^(-2L0/n) = .33382  |
+-----------------------------------------+
|     Efron |  McFadden  |  Ben./Lerman  |
|    .30834 |    .25406  |     .65614    |
|    Cramer | Veall/Zim. |     Rsqrd_ML  |
|    .31196 |    .44830  |     .29678    |
+-----------------------------------------+
| Information  Akaike I.C. Schwarz I.C.  |
| Criteria        1.11886       1.25658  |
+-----------------------------------------+
+-----------------------------------------------------------+
|Predictions for Binary Choice Model.  Predicted value is |
|1 when probability is greater than  .500000, 0 otherwise.|
|Note, column or row total percentages may not sum to     |
|100% because of rounding. Percentages are of full sample.|
+------+-----------------------------------+----------------+
|Actual|         Predicted Value           |                |
|Value |       0               1         | Total Actual   |
+------+---------------+-----------------+----------------+
|  0   |     68 ( 36.2%)|     24 ( 12.8%)|     92 ( 48.9%)|
|  1   |     24 ( 12.8%)|     72 ( 38.3%)|     96 ( 51.1%)|
```

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+------+----------------+----------------+----------------+
|Total |     92 ( 48.9%)|     96 ( 51.1%)|    188 (100.0%)|
+------+----------------+----------------+----------------+

================================================================================
Analysis of Binary Choice Model Predictions Based on Threshold =  .5000
--------------------------------------------------------------------------------
Prediction Success
--------------------------------------------------------------------------------
Sensitivity = actual 1s correctly predicted                        75.000%
Specificity = actual 0s correctly predicted                        73.913%
Positive predictive value = predicted 1s that were actual 1s       75.000%
Negative predictive value = predicted 0s that were actual 0s       73.913%
Correct prediction = actual 1s and 0s correctly predicted          74.468%
--------------------------------------------------------------------------------
Prediction Failure
--------------------------------------------------------------------------------
False pos. for true neg. = actual 0s predicted as 1s               26.087%
False neg. for true pos. = actual 1s predicted as 0s               25.000%
False pos. for predicted pos. = predicted 1s actual 0s             25.000%
False neg. for predicted neg. = predicted 0s actual 1s             26.087%
False predictions = actual 1s and 0s incorrectly predicted         25.532%
================================================================================
```

APPENDIX B

The data for Economic Factors Analysis of Individual Farmers in the Sample Areas

B1. Sub-indicator scores for economic factors analysis of the farmers in Pamiang area

Determinants	Indicators	Sub-indicator scores of the farmer in Pamiang area		
		Min	Max	Average
Resources	Natural resources	4	8	5.94
	Capital	5	9	6.49
	Human resources	2	8	5.58
	Technique & Technology	5	9	6.92
	Information	5	8	6.50
Infrastructures	Transport & communication	6	8	7.05
	Business environment	5	8	6.80
	Policy	4	8	5.99
	Associations	5	8	6.34
	R&D institutes & university	6	8	6.75
Suppliers & Related agencies	Supplier strength	4	8	5.84
	Quality of suppliers	4	8	6.04
	Cooperation with suppliers	4	8	5.79
	Related agencies strength	4	8	6.19
	Quality of related agencies	4	8	5.94
	Cooperation with related agencies	4	8	5.94
Structure & Strategies	Unanimous in group	5	8	6.45
	Ownership	5	8	6.19
	Production & Strategies plan	4	8	5.44
Competition	Bargaining power of suppliers	4	8	5.11
	Bargaining power of buyers	5	8	5.94
	Intensity of rivalry	5	8	6.24
	Threat of substitute products	4	8	6.09
	Threat of new entrants	3	8	5.54
Green relation	Green production management	4	6	4.61
	Green transportation	4	6	4.81
	Green disposal of waste	4	7	4.45
Local markets	Scale of local markets	4	8	6.12
	Local market share	5	9	6.39
	Growth & Opportunity	5	8	6.34
	Buyer boundaries	5	8	5.89
	Specific demand	4	8	5.69
External markets	Distances to external markets	4	8	5.97
	Scale & Growth rate	5	8	5.79
	External market share	5	6	5.40
	Characteristics of final consumers	4	6	4.91
	Entry to external markets	3	7	5.18

B2. Sub-indicator scores for economic factors analysis of the farmers in Pang Ma-O area

Determinants	Indicators	Sub-indicator scores of the farmer in Pang Ma-O area		
		Min	Max	Average
Resources	Natural resources	4	9	7.28
	Capital	4	9	5.91
	Human resources	2	9	6.99
	Technique & Technology	5	9	6.22
	Information	4	8	5.81
Infrastructures	Transport & communication	3	8	4.39
	Business environment	4	8	5.33
	Policy	4	8	4.80
	Associations	4	8	5.58
	R&D institutes & university	4	8	5.80
Suppliers & Related agencies	Supplier strength	3	8	5.13
	Quality of suppliers	4	8	6.00
	Cooperation with suppliers	4	8	5.29
	Related agencies strength	4	8	6.23
	Quality of related agencies	4	9	7.10
	Cooperation with related agencies	4	8	5.59
Structure & Strategies	Unanimous in group	5	9	7.38
	Ownership	5	8	7.09
	Production & Strategies plan	4	8	6.28
Competition	Bargaining power of suppliers	4	7	4.90
	Bargaining power of buyers	4	7	4.80
	Intensity of rivalry	4	8	5.51
	Threat of substitute products	4	8	6.48
	Threat of new entrants	3	8	5.71
Green relation	Green production management	5	9	7.78
	Green transportation	4	8	5.81
	Green disposal of waste	5	8	6.91
Local markets	Scale of local markets	4	7	5.99
	Local market share	4	9	5.81
	Growth & Opportunity	5	8	6.52
	Buyer boundaries	5	8	6.10
	Specific demand	5	8	6.91
External markets	Distances to external markets	3	8	3.91
	Scale & Growth rate	3	8	4.70
	External market share	3	6	4.33
	Characteristics of final consumers	3	6	5.20
	Entry to external markets	3	7	4.81

APPENDIX C

The Fuzzy Adoption of Green Practices of the Farmers

Farmers	The fuzzy adoption of green practices			
	GF1	GF2	GF3	GF4
TS1	(0.25, 0.50, 0.75)	(0.25, 0.50, 0.75)	(0.50, 0.75, 1.00)	(0.25, 0.50, 0.75)
TS2	(0.50, 0.75, 1.00)	(0.00, 0.25, 0.50)	(0.75, 1.00, 1.00)	(0.00, 0.25, 0.50)
TS3	(0.75, 1.00, 1.00)	(0.00, 0.00, 0.25)	(0.50, 0.75, 1.00)	(0.25, 0.50, 0.75)
TS4	(0.00, 0.25, 0.50)	(0.00, 0.25, 0.50)	(0.75, 1.00, 1.00)	(0.25, 0.50, 0.75)
TS5	(0.50, 0.75, 1.00)	(0.25, 0.50, 0.75)	(0.50, 0.75, 1.00)	(0.25, 0.50, 0.75)
TS6	(0.75, 1.00, 1.00)	(0.25, 0.50, 0.75)	(0.50, 0.75, 1.00)	(0.50, 0.75, 1.00)
TS7	(0.75, 1.00, 1.00)	(0.25, 0.50, 0.75)	(0.50, 0.75, 1.00)	(0.75, 1.00, 1.00)
TS8	(0.00, 0.25, 0.50)	(0.50, 0.75, 1.00)	(0.00, 0.25, 0.50)	(0.25, 0.50, 0.75)
TS9	(0.50, 0.75, 1.00)	(0.25, 0.50, 0.75)	(0.25, 0.50, 0.75)	(0.00, 0.25, 0.50)
TS10	(0.00, 0.25, 0.50)	(0.00, 0.25, 0.50)	(0.50, 0.75, 1.00)	(0.25, 0.50, 0.75)
TS11	(0.50, 0.75, 1.00)	(0.00, 0.00, 0.25)	(0.50, 0.75, 1.00)	(0.50, 0.75, 1.00)
TS12	(0.50, 0.75, 1.00)	(0.00, 0.25, 0.50)	(0.25, 0.50, 0.75)	(0.50, 0.75, 1.00)
TS13	(0.25, 0.50, 0.75)	(0.75, 1.00, 1.00)	(0.25, 0.50, 0.75)	(0.75, 1.00, 1.00)
TS14	(0.50, 0.75, 1.00)	(0.25, 0.50, 0.75)	(0.50, 0.75, 1.00)	(0.50, 0.75, 1.00)
TS15	(0.00, 0.00, 0.25)	(0.00, 0.25, 0.50)	(0.50, 0.75, 1.00)	(0.25, 0.50, 0.75)
TS16	(0.50, 0.75, 1.00)	(0.00, 0.00, 0.25)	(0.25, 0.50, 0.75)	(0.75, 1.00, 1.00)
TS17	(0.00, 0.25, 0.50)	(0.00, 0.25, 0.50)	(0.00, 0.25, 0.50)	(0.50, 0.75, 1.00)
TS18	(0.00, 0.25, 0.50)	(0.00, 0.25, 0.50)	(0.75, 1.00, 1.00)	(0.25, 0.50, 0.75)
TS19	(0.00, 0.25, 0.50)	(0.25, 0.50, 0.75)	(0.75, 1.00, 1.00)	(0.25, 0.50, 0.75)
TS20	(0.25, 0.50, 0.75)	(0.00, 0.25, 0.50)	(0.25, 0.50, 0.75)	(0.50, 0.75, 1.00)
TS21	(0.75, 1.00, 1.00)	(0.25, 0.50, 0.75)	(0.00, 0.25, 0.50)	(0.25, 0.50, 0.75)
TS22	(0.25, 0.50, 0.75)	(0.00, 0.25, 0.50)	(0.50, 0.75, 1.00)	(0.25, 0.50, 0.75)
TS23	(0.75, 1.00, 1.00)	(0.25, 0.50, 0.75)	(0.25, 0.50, 0.75)	(0.50, 0.75, 1.00)
TS24	(0.25, 0.50, 0.75)	(0.25, 0.50, 0.75)	(0.50, 0.75, 1.00)	(0.00, 0.25, 0.50)
TS25	(0.00, 0.25, 0.50)	(0.25, 0.50, 0.75)	(0.75, 1.00, 1.00)	(0.25, 0.50, 0.75)
TS26	(0.25, 0.50, 0.75)	(0.75, 1.00, 1.00)	(0.25, 0.50, 0.75)	(0.00, 0.00, 0.25)
TS27	(0.50, 0.75, 1.00)	(0.50, 0.75, 1.00)	(0.00, 0.25, 0.50)	(0.25, 0.50, 0.75)
TS28	(0.25, 0.50, 0.75)	(0.50, 0.75, 1.00)	(0.25, 0.50, 0.75)	(0.00, 0.00, 0.25)
TS29	(0.00, 0.25, 0.50)	(0.25, 0.50, 0.75)	(0.50, 0.75, 1.00)	(0.00, 0.00, 0.25)
PM1	(0.50, 0.75, 1.00)	(0.00, 0.25, 0.50)	(0.25, 0.50, 0.75)	(0.50, 0.75, 1.00)

Farmers	The fuzzy adoption of green practices			
	GF1	GF2	GF3	GF4
PM2	(0.25, 0.50, 0.75)	(0.50, 0.75, 1.00)	(0.00, 0.25, 0.50)	(0.25, 0.50, 0.75)
PM3	(0.75, 1.00, 1.00)	(0.25, 0.50, 0.75)	(0.25, 0.50, 0.75)	(0.50, 0.75, 1.00)
PM4	(0.50, 0.75, 1.00)	(0.50, 0.75, 1.00)	(0.50, 0.75, 1.00)	(0.25, 0.50, 0.75)
PM5	(0.50, 0.75, 1.00)	(0.25, 0.50, 0.75)	(0.00, 0.25, 0.50)	(0.50, 0.75, 1.00)
PM6	(0.00, 0.25, 0.50)	(0.50, 0.75, 1.00)	(0.25, 0.50, 0.75)	(0.50, 0.75, 1.00)
PM7	(0.50, 0.75, 1.00)	(0.00, 0.25, 0.50)	(0.00, 0.25, 0.50)	(0.00, 0.25, 0.50)
PM8	(0.25, 0.50, 0.75)	(0.75, 1.00, 1.00)	(0.25, 0.50, 0.75)	(0.00, 0.25, 0.50)
PM9	(0.50, 0.75, 1.00)	(0.00, 0.25, 0.50)	(0.50, 0.75, 1.00)	(0.00, 0.00, 0.25)
PM10	(0.50, 0.75, 1.00)	(0.25, 0.50, 0.75)	(0.50, 0.75, 1.00)	(0.50, 0.75, 1.00)
PM11	(0.50, 0.75, 1.00)	(0.00, 0.25, 0.50)	(0.75, 1.00, 1.00)	(0.50, 0.75, 1.00)
PM12	(0.50, 0.75, 1.00)	(0.00, 0.00, 0.25)	(0.00, 0.25, 0.50)	(0.25, 0.50, 0.75)
PM13	(0.50, 0.75, 1.00)	(0.00, 0.25, 0.50)	(0.25, 0.50, 0.75)	(0.25, 0.50, 0.75)
PM14	(0.50, 0.75, 1.00)	(0.25, 0.50, 0.75)	(0.50, 0.75, 1.00)	(0.25, 0.50, 0.75)
PM15	(0.00, 0.25, 0.50)	(0.00, 0.25, 0.50)	(0.00, 0.25, 0.50)	(0.50, 0.75, 1.00)
PM16	(0.75, 1.00, 1.00)	(0.25, 0.50, 0.75)	(0.25, 0.50, 0.75)	(0.25, 0.50, 0.75)
PM17	(0.50, 0.75, 1.00)	(0.00, 0.25, 0.50)	(0.50, 0.75, 1.00)	(0.50, 0.75, 1.00)
PM18	(0.50, 0.75, 1.00)	(0.00, 0.00, 0.25)	(0.25, 0.50, 0.75)	(0.25, 0.50, 0.75)
PM19	(0.50, 0.75, 1.00)	(0.00, 0.25, 0.50)	(0.00, 0.25, 0.50)	(0.25, 0.50, 0.75)
PM20	(0.50, 0.75, 1.00)	(0.25, 0.50, 0.75)	(0.50, 0.75, 1.00)	(0.25, 0.50, 0.75)
PM21	(0.50, 0.75, 1.00)	(0.50, 0.75, 1.00)	(0.25, 0.50, 0.75)	(0.00, 0.25, 0.50)
PM22	(0.00, 0.25, 0.50)	(0.50, 0.75, 1.00)	(0.50, 0.75, 1.00)	(0.75, 1.00, 1.00)
PM23	(0.25, 0.50, 0.75)	(0.25, 0.50, 0.75)	(0.25, 0.50, 0.75)	(0.25, 0.50, 0.75)
PM24	(0.75, 1.00, 1.00)	(0.00, 0.25, 0.50)	(0.50, 0.75, 1.00)	(0.50, 0.75, 1.00)
PM25	(0.50, 0.75, 1.00)	(0.25, 0.50, 0.75)	(0.25, 0.50, 0.75)	(0.25, 0.50, 0.75)
PM26	(0.50, 0.75, 1.00)	(0.00, 0.25, 0.50)	(0.50, 0.75, 1.00)	(0.50, 0.75, 1.00)
PM27	(0.75, 1.00, 1.00)	(0.50, 0.75, 1.00)	(0.50, 0.75, 1.00)	(0.50, 0.75, 1.00)

Source: Calculation.

Note: TS and PM mean the farmer in Pamiang and Pang Ma-O areas, respectively.

APPENDIX D

The Costs of the Farmers in the GCSC

Unit: Bath/Kg. parchment coffee

Farmers	Costs in the GCSC of the farmers		
	$\tilde{PRC}^{f\_green}$	$\tilde{DC}^{f\_green}$	$\tilde{TRC}^{f\_green}$
TS1	(59.97, 62.54, 65.12)	(1.80, 3.22, 4.65)	(0.21, 0.22, 0.22)
TS2	(38.57, 41.90, 45.22)	(2.55, 4.46, 5.52)	(0.85, 0.87, 0.89)
TS3	(72.41, 72.41, 76.90)	(0.87, 1.30, 2.80)	(1.33, 1.35, 1.38)
TS4	(50.81, 56.33, 61.85)	(1.25, 2.72, 3.78)	(0.43, 0.46, 0.49)
TS5	(47.10, 50.29, 53.49)	(2.12, 3.71, 5.30)	(0.37, 0.38, 0.40)
TS6	(65.30, 65.30, 70.33)	(2.47, 4.23, 5.99)	(0.84, 0.87, 0.89)
TS7	(46.99, 46.99, 50.11)	(2.37, 4.08, 5.79)	(2.18, 2.31, 2.31)
TS8	(43.65, 47.98, 52.30)	(2.11, 4.00, 5.88)	(0.34, 0.36, 0.39)
TS9	(55.23, 59.67, 64.10)	(1.87, 3.75, 5.62)	(0.46, 0.49, 0.53)
TS10	(52.75, 56.50, 60.25)	(1.00, 2.56, 4.11)	(0.37, 0.39, 0.40)
TS11	(35.20, 42.19, 49.18)	(1.10, 1.64, 3.25)	(1.61, 1.70, 1.80)
TS12	(37.61, 43.52, 49.43)	(0.40, 1.86, 3.31)	(2.75, 2.93, 3.11)
TS13	(47.33, 51.04, 54.75)	(4.17, 6.23, 7.23)	(6.17, 6.46, 6.46)
TS14	(73.32, 77.32, 81.33)	(3.28, 5.45, 7.61)	(5.01, 5.26, 5.50)
TS15	(56.49, 59.32, 59.32)	(0.53, 1.86, 3.18)	(0.81, 0.86, 0.91)
TS16	(66.42, 68.74, 71.05)	(0.75, 1.50, 3.31)	(3.57, 3.73, 3.73)
TS17	(68.97, 72.09, 75.21)	(0.00, 1.59, 3.18)	(0.54, 0.56, 0.59)
TS18	(51.84, 55.15, 58.45)	(1.07, 2.49, 3.54)	(0.44, 0.46, 0.49)
TS19	(63.21, 67.49, 71.77)	(2.56, 4.11, 5.17)	(0.58, 0.63, 0.67)
TS20	(44.84, 48.80, 52.76)	(1.00, 3.06, 5.11)	(1.19, 1.25, 1.31)
TS21	(64.56, 64.56, 68.10)	(1.06, 2.77, 4.48)	(2.82, 2.99, 3.17)
TS22	(72.01, 75.97, 79.92)	(5.00, 8.56, 12.11)	(2.74, 2.92, 3.09)
TS23	(66.82, 66.82, 68.47)	(3.56, 7.11, 10.67)	(1.82, 1.93, 2.04)
TS24	(60.14, 65.45, 70.77)	(1.77, 3.19, 4.60)	(0.78, 0.79, 0.79)
TS25	(72.85, 76.18, 79.51)	(2.06, 3.45, 4.50)	(0.57, 0.60, 0.63)
TS26	(45.70, 50.72, 55.75)	(3.97, 5.83, 6.63)	(1.58, 1.58, 1.61)
TS27	(68.90, 73.45, 77.99)	(2.11, 5.90, 9.68)	(5.34, 5.45, 5.57)
TS28	(73.87, 79.29, 84.70)	(2.56, 4.06, 5.56)	(0.41, 0.41, 0.42)

Farmers	Costs in the GCSC of the farmers		
	$\tilde{PRC}^{f\_green}$	$\tilde{DC}^{f\_green}$	$\tilde{TRC}^{f\_green}$
TS29	(64.79, 68.26, 71.74)	(1.78, 3.20, 4.63)	(0.52, 0.52, 0.53)
PM1	(62.14, 63.37, 64.60)	(2.00, 5.06, 8.11)	(1.44, 1.47, 1.50)
PM2	(71.42, 72.72, 74.57)	(2.11, 6.17, 10.23)	(1.41, 1.50, 1.59)
PM3	(71.94, 71.94, 72.56)	(2.06, 4.11, 6.17)	(1.70, 1.78, 1.87)
PM4	(58.89, 61.29, 63.70)	(5.86, 8.80, 11.73)	(1.18, 1.25, 1.33)
PM5	(81.85, 82.62, 83.40)	(1.06, 3.36, 5.67)	(1.00, 1.05, 1.10)
PM6	(63.35, 64.27, 65.18)	(3.00, 4.95, 6.89)	(0.49, 0.52, 0.55)
PM7	(53.38, 54.17, 54.95)	(0.00, 1.64, 3.27)	(0.35, 0.36, 0.37)
PM8	(55.22, 56.35, 57.49)	(3.97, 5.83, 6.63)	(0.48, 0.49, 0.50)
PM9	(69.71, 71.48, 73.25)	(1.67, 3.56, 5.45)	(0.69, 0.69, 0.71)
PM10	(64.05, 65.04, 66.02)	(2.49, 4.26, 6.03)	(0.77, 0.80, 0.84)
PM11	(48.49, 50.66, 52.82)	(2.31, 4.13, 5.19)	(1.01, 1.03, 1.05)
PM12	(58.85, 59.68, 60.51)	(0.00, 1.25, 3.56)	(1.82, 1.91, 2.01)
PM13	(81.58, 81.97, 82.36)	(0.87, 2.80, 4.72)	(0.60, 0.62, 0.64)
PM14	(53.32, 54.35, 55.38)	(2.47, 4.23, 5.99)	(0.86, 0.88, 0.90)
PM15	(69.47, 71.11, 72.75)	(0.00, 1.84, 3.68)	(0.66, 0.69, 0.72)
PM16	(55.92, 55.92, 56.49)	(2.31, 4.61, 6.92)	(1.15, 1.21, 1.27)
PM17	(86.44, 86.71, 86.97)	(1.33, 3.06, 4.78)	(1.48, 1.51, 1.54)
PM18	(51.44, 52.19, 52.94)	(1.20, 2.40, 4.66)	(1.29, 1.38, 1.47)
PM19	(73.82, 74.93, 76.04)	(0.00, 1.88, 3.76)	(0.85, 0.90, 0.95)
PM20	(67.17, 67.57, 67.98)	(2.06, 3.61, 5.17)	(0.42, 0.45, 0.47)
PM21	(59.41, 60.08, 60.75)	(2.88, 4.71, 6.53)	(0.62, 0.64, 0.66)
PM22	(42.18, 46.40, 50.61)	(3.83, 5.74, 7.66)	(2.80, 2.86, 2.86)
PM23	(53.36, 56.12, 58.87)	(2.06, 4.11, 6.17)	(2.04, 2.14, 2.25)
PM24	(48.83, 48.83, 50.54)	(1.67, 3.56, 5.45)	(2.07, 2.11, 2.15)
PM25	(44.13, 46.76, 49.38)	(2.02, 4.05, 6.07)	(2.43, 2.55, 2.68)
PM26	(48.33, 50.27, 52.21)	(2.07, 4.16, 6.25)	(1.67, 1.75, 1.83)
PM27	(67.90, 67.90, 70.52)	(3.61, 5.42, 7.23)	(1.62, 1.65, 1.69)

Source: Calculation.

Note: TS and PM mean the farmer in Pamiang and Pang Ma-O areas, respectively.

APPENDIX E

The Production Capacity of Parchment Coffee of Individual Farmers in the Sample Areas

E1. The production capacity of parchment coffee of the farmers in Pamiang area

The i^{th} farmer in Pamiang area	The ability of farmers to produce parchment coffee for delivering to RPF (kilograms)	The ability of farmers to produce overall parchment coffee (kilograms)
TS1	608	1,350
TS2	216	470
TS3	432	920
TS4	576	1,200
TS5	368	750
TS6	213	425
TS7	311	610
TS8	252	485
TS9	260	490
TS10	336	800
TS11	336	730
TS12	588	1,250
TS13	144	300
TS14	132	270
TS15	750	1,500
TS16	204	400
TS17	390	750
TS18	672	1,400
TS19	640	800
TS20	150	300
TS21	274	610
TS22	60	120
TS23	58	120
TS24	770	1,400
TS25	780	1,500
TS26	175	500
TS27	57	110
TS28	522	900
TS29	649	1,100

E2. The production capacity of parchment coffee of the farmers in Pang Ma-O area

The j^{th} farmer in Pang Ma-O	The ability of farmers to produce parchment coffee for delivering to RPF (kilograms)	The ability of farmers to produce overall parchment coffee (kilograms)
PM1	150	150
PM2	100	100
PM3	300	300
PM4	160	160
PM5	240	240
PM6	450	450
PM7	690	690
PM8	500	500
PM9	480	480
PM10	420	420
PM11	520	520
PM12	240	240
PM13	460	460
PM14	425	425
PM15	510	510
PM16	240	240
PM17	600	600
PM18	250	250
PM19	485	485
PM20	800	800
PM21	520	520
PM22	350	350
PM23	300	300
PM24	360	360
PM25	310	310
PM26	290	290
PM27	400	400

CURRICULUM VITAE

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Publication	1) Chanita Panmanee & Aree Wiboonpongse, "Determinants of Green Cluster Supply Chain Adoption and Practice of Arabica Coffee Growers in Pang Ma-O and Pamiang Areas," International Journal of Intelligent Technologies and Applied Statistics, Vol. 9, No. 2, June 2016, 169-189. 2) Chanita Panmanee, Aree Wiboonpongse, Yaovarate Chaovanapoonphol & Wan-Tran Huang, "Revenue Sharing in Green Cluster Supply Chain of Highland Arabica Coffee," Proceedings of the 9th ASAE International Conference on Transformation in Agricultural and Food Economy in Asia, Bangkok, Thailand, 11-13 January, 2017, 785-797.