APPENDICES

APPENDIX A

QUESTIONNAIRES

Questionnaire for inquiry the current situation of deepwater rice to flooded rice production system in Prachin Buri and Chachoengsao province, Thailand, 2009 – 2010

Interviewer Name ..... Surname …….....

Date of interview……/……/……

Questionnaire

Current Situation of the Transition Deepwater Rice

to Flooded Rice Production Systems

Objectives of data collection

A. To gain better understanding of flooded rice production in the deepwater area in term of variety selection, appropriate planting date and chemical fertilizer management
B. For planning to develop rice production technology for such specific area

1. Farmer's address and field ownership

Farmer's name..... Surname .....

Address ..... Village number..... Sub district.....

District……..Province……..

Number of rice field..... Field size First field.....ha

Second field.....ha Third field.....ha

Fourth field.....ha Fifth field.....ha

Owned field ..... ha Renting.....ha

2. Planting date

Flooded rice

Early rainy season

Planting date ……/…… (dd/mm).

Planting method ○ dry seeded ○ pre-germinated seed

Dry season

Planting date ……/…… (dd/mm).

Planting method ○ dry seeded ○ pre-germinated seed

Low land rice

Planting date ……/…… (dd/mm).

Planting method ○ dry seeded ○ pre-germinated seed

Deepwater rice

Planting date ……/…… (dd/mm).

Planting method ○ dry seeded ○ pre-germinated seed

Source of information for selection appropriate planting date

☐ Trial and error
☐ Neighbor
☐ Government agency: Specify ○ Rice Department
○ Department of Agricultural Extension ○ BAC
○ Cooperatives
○ etc (specify) ……..
☐ Local middle-man
☐ Others e.g. community radio station and television

3. Rice variety

Rice variety name

1. .....
2. .....
3. .....
4. .....

Reasons for rice production

Flooded rice …….....
……

……
……
Low land rice …….....
……
……
……
Deepwater rice …….....
……
……
……

Source of information for rice variety selection

☐ Trial and error
☐ Neighbor
☐ Government agency: Specify ○ Rice Department
○ Department of Agricultural Extension ○ BAC
○ Cooperatives
○ etc (specify)
……..
☐ Local middle-man
☐ Others e.g. community radio station and television

4. Fertilizer management data

Time of application

1st application…… dap, Formula.....Rate ..... kg ha^{-1}

2nd application…… dap, Formula.....Rate ..... kg ha^{-1}

3rd application…… dap, Formula.....Rate ..... kg ha^{-1}

(dap = days after planting)

Source of information for rice variety selection

☐ Trial and error
☐ Neighbor
☐ Government agency: Specify ○ Rice Department
○ Department of Agricultural Extension

○ BAC
○ Cooperatives
○ etc (specify)
……..

☐ Local middle man
☐ Others e.g. community radio station and television

5. Harvesting data

Flooded rice
Harvesting date ..... days after planting
Harvesting methods ☐ manual ☐ Combine harvester
Low land rice
Harvesting date ...../..... (dd/mm)
Harvesting methods ☐ manual ☐ Combine harvester
Deepwater rice
Harvesting date ...../..... (dd/mm)
Harvesting methods ☐ manual ☐ Combine harvester

Yield ..... kg ha^{-1}

6. **Rank these following items** by most to least significant in term of flooded rice production
(1 = most significant, 2 = significant less than 1 and 3 = less significant)
..... Rice variety selection
..... Planting date selection
. ..... Fertilizer management

Other significant factor in your opinion (specify)
….....
.....
.....

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APPENDIX B

Arithmetic Mean is the sum of the entire list divided by the number of items in the list (Miller *et al*., 2009). Arithmetically, it can be written as:

$$\bar{x} = \frac{1}{n} \cdot \sum_{i=1}^{n} x_i \qquad (1)$$

where: $\bar{x}$: arithmetic mean

x_i : the i^{th} value of parameter x

i : 1, 2, ..., n

n : number of values in parameter x

Standard deviation (SD) shows how much variation there is from the "average" (mean). A low standard deviation indicates that the data points tend to be very close to the mean, whereas high standard deviation indicates that the data is spread out over a large range of values. Calculation can be done as following equation (Gravetter and Wallnau, 2008):

$$SD = \sqrt{\frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n}} \qquad (2)$$

where: x : each value of data set

n : number of x

ANOVA technique was used to analyze collected data for comparison the effect of fertilizer managements and rice variety on growth and yield of flooded rice production in deepwater area. The linear effects model for split-plot design is (William and Gettinby, 1998):

$$x_{ijk} = \mu + \rho_i + \alpha_j + \rho\alpha_{ij} + \beta_k + \alpha\beta_{jk} + \rho\alpha\beta_{ijk} \qquad (3)$$

where: i : 1, 2,…, n,

j : 1, 2,…, a,

k : 1, 2,…, b,

The above linear model can be explained with the following equation:

Observation = (overall mean) + (replication effect) + (A effect) + (main-plot residue)

+ (B effect) + (interaction Between A and B effect) + (sub-plot residue)

(Williams *et al*., 2002)

APPENDIX C

INPUT FILES FOR CSM-CERES-RICE MODEL

FileX

```
*EXP.DETAILS: RDPC0902RI EFFECTS OF PLANTING DATE AND VARIETY ON FLOODED RICE PRO.

*GENERAL
@PEOPLE
Chitnucha Buddhaboon
@ADDRESS
Prachin Buri Rice Research Center
@SITE
Bangtaen, Bansang, Prachin Buri, Thailand
@ PAREA  PRNO  PLEN  PLDR  PLSP  PLAY HAREA  HRNO  HLEN  HARM.........
    -99   -99   -99   -99   -99   -99   -99   -99   -99   -99

*TREATMENTS                        -------------FACTOR LEVELS------------
@N R O C TNAME.................... CU FL SA IC MP MI MF MR MC MT ME MH SM
 1 1 0 0 P1 CNT1                   1  1  1  1  1  1  1  0  0  0  0  0  1
 2 1 0 0 P1 PTT1                   2  1  1  1  1  1  1  0  0  0  0  0  1
 3 1 0 0 P1 PSL2                   3  1  1  1  1  1  1  0  0  0  0  0  1
 4 1 0 0 P2 CNT1                   1  1  1  1  2  2  2  0  0  0  0  0  1
 5 1 0 0 P2 PTT1                   2  1  1  1  2  2  2  0  0  0  0  0  1
 6 1 0 0 P2 PSL2                   3  1  1  1  2  2  2  0  0  0  0  0  1
 7 1 0 0 P3 CNT1                   1  1  1  1  3  3  3  0  0  0  0  0  1
 8 1 0 0 P3 PTT1                   2  1  1  1  3  3  3  0  0  0  0  0  1
 9 1 0 0 P3 PSL2                   3  1  1  1  3  3  3  0  0  0  0  0  1
10 1 0 0 P4 CNT1                   1  1  1  1  4  4  4  0  0  0  0  0  1
11 1 0 0 P4 PTT1                   2  1  1  1  4  4  4  0  0  0  0  0  1
12 1 0 0 P4 PSL2                   3  1  1  1  4  4  4  0  0  0  0  0  1


*CULTIVARS
@C CR INGENO CNAME
 1 RI TR0004 CHAINAT1
 2 RI TR0008 PATHUMTHANI1
 3 RI TR0009 PITSANULOKE2

*FIELDS
@L ID_FIELD WSTA....  FLSA  FLOB  FLDT  FLDD  FLDS  FLST SLTX  SLDP  ID_SOIL    FLNAME
 1 RDPC0001 RDPC       -99     0   -99     0     0   -99 CL      60  TH00000082 The Bang
Taen field
@L ...........XCRD ...........YCRD .....ELEV .............AREA .SLEN .FLWR .SLAS FLHST FHDUR
 1             0             0         0                  0     0     0     0   -99   -99
```

```
*SOIL ANALYSIS
@A SADAT  SMHB  SMPX  SMKE  SANAME
 1 09163 SA011 SA003 SA015  0-60
@A  SABL  SADM  SAOC  SANI SAPHW SAPHB  SAPX  SAKE  SASC
 1    15   1.3   2.3    .1     4   -99   9.6  81.3   -99
 1    30   1.5     1    .1   3.8   -99   4.5  86.3   -99
 1    45   1.4    .4   .04   3.2   -99   2.3  78.1   -99
 1    60   1.4    .3   .04   3.2   -99   2.3    85   -99

*INITIAL CONDITIONS
@C   PCR ICDAT  ICRT  ICND  ICRN  ICRE  ICWD ICRES ICREN ICREP ICRIP ICRID ICNAME
 1    RI 09163   800   -99   -99   -99   -99  3725    .7     0   100    15 -99
@C  ICBL  SH2O  SNH4  SNO3
 1    15  .439    12    .7
 1    30  .412     3    .3
 1    45  .428     3    .3
 1    60  .469     3    .3

*PLANTING DETAILS
@P PDATE EDATE  PPOP  PPOE  PLME  PLDS  PLRS  PLRD  PLDP  PLWT  PAGE  PENV  PLPH  SPRL
PLNAME
 1 09170   -99    25   -99     T     H    20     0     5   118    28    30     3     0  -99
 2 09183   -99    25   -99     T     H    20     0     5    87    28    30     3     0  -99
 3 09197   -99    25   -99     T     H    20     0     5    75    22    30     3     0  -99
 4 09204   -99    25   -99     T     H    20     0     5    64    22    30     3     0  -99

*IRRIGATION AND WATER MANAGEMENT
@I  EFIR  IDEP  ITHR  IEPT  IOFF  IAME  IAMT IRNAME
 1   -99   -99   -99   -99   -99   -99     1 Flooded irrigation
@I IDATE  IROP IRVAL
 1 09169 IR009    20
 1 09169 IR011     5
 1 09169 IR010     0
 1 09169 IR008     2
 1 09176 IR009   100
 1 09176 IR011    30
 1 09181 IR009   150
 1 09181 IR011    50
 1 09187 IR006    65
@I  EFIR  IDEP  ITHR  IEPT  IOFF  IAME  IAMT IRNAME
 2   -99   -99   -99   -99   -99   -99     1 Flooded irrigation
@I IDATE  IROP IRVAL
 2 09182 IR010     0
 2 09182 IR011     5
 2 09182 IR008     2
 2 09182 IR009    20
 2 09189 IR009   100
 2 09189 IR011    30
 2 09194 IR009   150
 2 09194 IR011    50
 2 09201 IR006    65
@I  EFIR  IDEP  ITHR  IEPT  IOFF  IAME  IAMT IRNAME
 3   -99   -99   -99   -99   -99   -99     1 Flooded irrigation
@I IDATE  IROP IRVAL
 3 09196 IR009    20
 3 09196 IR011     5
```

```
 3 09196 IR010     0
 3 09196 IR008     2
 3 09203 IR009   100
 3 09203 IR011    30
 3 09208 IR009   150
 3 09208 IR011    50
 3 09216 IR006    65
@I  EFIR  IDEP  ITHR  IEPT  IOFF  IAME  IAMT IRNAME
 4   -99   -99   -99   -99   -99   -99     1 Flooded irrigation
@I IDATE  IROP IRVAL
 4 09203 IR010     0
 4 09203 IR011     5
 4 09203 IR008     2
 4 09203 IR009    20
 4 09210 IR009   100
 4 09210 IR011    30
 4 09215 IR009   150
 4 09215 IR011    50
 4 09222 IR006    65

*FERTILIZERS (INORGANIC)
@F FDATE  FMCD  FACD  FDEP  FAMN  FAMP  FAMK  FAMC  FAMO  FOCD FERNAME
 1 09177 FE012 AP016     0    30    36   -99   -99   -99   -99 -99
 1 09191 FE005 AP012     0    29   -99   -99   -99   -99   -99 -99
 2 09190 FE012 AP016     0    30    36   -99   -99   -99   -99 -99
 2 09215 FE005 AP012     0    29   -99   -99   -99   -99   -99 -99
 3 09204 FE012 AP016     0    30    36   -99   -99   -99   -99 -99
 3 09230 FE005 AP012     0    29   -99   -99   -99   -99   -99 -99
 4 09211 FE012 AP016     0    30    36   -99   -99   -99   -99 -99
 4 09237 FE005 AP012     0    29   -99   -99   -99   -99   -99 -99

*RESIDUES AND ORGANIC FERTILIZER
@R RDATE  RCOD  RAMT  RESN  RESP  RESK  RINP  RDEP  RMET RENAME
 1 09160   -99   -99   -99   -99   -99   -99   -99   -99 -99

*TILLAGE AND ROTATIONS
@T TDATE TIMPL  TDEP TNAME
 1 09163 TI007    20 -99
 1 09169 TI014   -99 -99
 1 09169 TI010    10 -99

*ENVIRONMENT MODIFICATIONS
@E ODATE EDAY  ERAD  EMAX  EMIN  ERAIN ECO2  EDEW  EWIND ENVNAME
 1 09163 A   0 A   0 A   0 A   0 A 0.0 0   0 A   0 A   0 0

*HARVEST DETAILS
@H HDATE  HSTG  HCOM HSIZE   HPC  HBPC HNAME
 1 09163 GS000   -99   -99   -99   -99 Rice

*SIMULATION CONTROLS
@N GENERAL     NYERS NREPS START SDATE RSEED SNAME.................... SMODEL
 1 GE              1     1     S 09163  2150 Effects of appl. N        RICER
@N OPTIONS     WATER NITRO SYMBI PHOSP POTAS DISES  CHEM  TILL   CO2
 1 OP              Y     Y     N     N     N     N     N     N     M
@N METHODS     WTHER INCON LIGHT EVAPO INFIL PHOTO HYDRO NSWIT MESOM MESEV MESOL
 1 ME              M     M     E     R     S     C     R     1     G     S     2
```

```
@N MANAGEMENT  PLANT IRRIG FERTI RESID HARVS
 1 MA             R     R     R     N     M
@N OUTPUTS     FNAME OVVEW SUMRY FROPT GROUT CAOUT WAOUT NIOUT MIOUT DIOUT VBOSE CHOUT OPOUT
 1 OU              N     Y     Y     1     Y     N     Y     Y     N     N     A     N     Y

@  AUTOMATIC MANAGEMENT
@N PLANTING    PFRST PLAST PH2OL PH2OU PH2OD PSTMX PSTMN
 1 PL          85239 85253    40   100    30    40    10
@N IRRIGATION  IMDEP ITHRL ITHRU IROFF IMETH IRAMT IREFF
 1 IR             30    50   100 IB001 IR006    10    .5
@N NITROGEN    NMDEP NMTHR NAMNT NCODE NAOFF
 1 NI             30    50    25 IB001 IB001
@N RESIDUES    RIPCN RTIME RIDEP
 1 RE            100     1    20
@N HARVEST     HFRST HLAST HPCNP HPCNR
 1 HA              0 86246   100     0
```

FileA

*EXP. DATA (A): RDPC0902RI Effects of appl. N & envir. on rice
! File last edited on day 08/12/2010 at 11:20:09 AM
!

@TRNO	HWAM	HWUM	H#AM	H#UM	LAIX	T#AM	CWAM	BWAH	ADAT	MDAT	GN%M	CNAM	SNAM	GNAM
1	3618	0.028	12921	49.9	-99	267	8628	-99	235	266	-99	54.4	18.6	-99
2	4182	0.027	15489	39.8	-99	345	9066	-99	232	264	-99	55.3	17.7	-99
3	3996	0.028	14271	42.6	-99	322	8414	-99	230	260	-99	62.7	18.1	-99
4	3462	0.028	12364	46.3	-99	264	8189	-99	248	275	-99	55.3	17.1	-99
5	3494	0.026	13438	50.0	-99	251	8179	-99	247	273	-99	58.1	15.9	-99
6	4058	0.026	15608	43.0	-99	300	8224	-99	246	279	-99	61.7	15.1	-99
7	3378	0.027	12511	44.8	-99	314	8556	-99	256	287	-99	73.6	22.3	-99
8	3621	0.026	13927	53.4	-99	299	9289	-99	263	294	-99	74.8	21.5	-99
9	3697	0.027	13693	34.3	-99	327	7720	-99	256	287	-99	61.8	13.3	-99
10	3658	0.029	12614	44.2	-99	299	8663	-99	271	297	-99	65.8	19.4	-99
11	3738	0.027	13844	46.4	-99	317	9555	-99	273	299	-99	87.0	22.6	-99
12	3842	0.027	14230	51.5	-99	292	7658	-99	266	294	-99	62.4	13.2	-99

File T

*EXP. DATA (T): RDPC0902RI Effects of appl. N & envir. on rice
! File last edited on day 09/13/2010 at 1:26:44 AM

@TRNO	DATE	T#AD	LAID	LN%D	SN%D	RWAD	SWAD	GWAD	LWAD	CWAD
1	09142	-99	-99	-99	-99	-99	-99	-99	-99	-99
1	09170	75	-99	-99	-99	-99	-99	-99	-99	143
1	09204	364	-99	2.65	1.24	-99	1074	0	906	1980
1	09235	285	-99	1.40	0.68	-99	4900	729	1291	6190
1	09253	270	-99	0.87	0.61	-99	5197	1266	1203	6400
1	09266	268	-99	0.66	0.60	-99	3099	3618	1691	8628
2	09142	-99	-99	-99	-99	-99	-99	-99	-99	-99
2	09170	75	-99	-99	-99	-99	-99	-99	-99	130
2	09200	404	-99	2.82	1.30	-99	1121	0	831	1952
2	09232	356	-99	1.71	0.66	-99	4379	504	1533	5912
2	09253	313	-99	0.87	0.65	-99	6249	1162	1236	7485
2	09264	303	-99	0.67	0.55	-99	3224	4182	1476	9066
3	09142	-99	-99	-99	-99	-99	-99	-99	-99	-99
3	09170	75	-99	-99	-99	-99	-99	-99	-99	82
3	09197	345	-99	2.74	1.22	-99	1136	0	829	1965
3	09230	283	-99	1.78	0.70	-99	4699	278	1309	6009
3	09251	235	-99	1.13	0.67	-99	5760	1012	1155	6915
3	09260	235	-99	0.86	0.63	-99	2870	3996	1329	8414
4	09155	-99	-99	-99	-99	-99	-99	-99	-99	-99
4	09183	75	-99	-99	-99	-99	-99	-99	-99	131
4	09216	334	-99	2.31	1.01	-99	1171	0	891	2062
4	09248	268	-99	1.21	0.69	-99	4658	725	1492	6151
4	09268	270	-99	1.14	0.62	-99	6385	1524	1319	7704
4	09275	265	-99	0.78	0.57	-99	2997	3462	1520	8189
5	09155	-99	-99	-99	-99	-99	-99	-99	-99	-99
5	09183	75	-99	-99	-99	-99	-99	-99	-99	135
5	09219	351	-99	2.53	1.11	-99	1355	0	932	2287
5	09247	290	-99	1.33	0.73	-99	4224	469	1279	5503
5	09266	285	-99	1.19	0.66	-99	5798	1076	1129	6927
5	09273	283	-99	0.88	0.54	-99	2941	3494	1531	8179
6	09155	-99	-99	-99	-99	-99	-99	-99	-99	-99

6	09183	75	-99	-99	-99	-99	-99	-99	-99	146
6	09216	359	-99	2.71	1.13	-99	1207	0	924	2131
6	09246	267	-99	1.27	0.74	-99	4701	273	1190	5892
6	09264	263	-99	1.17	0.72	-99	5181	1003	1674	6855
6	09269	260	-99	0.93	0.57	-99	2646	4058	1275	8224
7	09175	-99	-99	-99	-99	-99	-99	-99	-99	-99
7	09197	75	-99	-99	-99	-99	-99	-99	-99	99
7	09225	358	-99	2.47	0.76	-99	1889	0	1489	3378
7	09256	279	-99	2.28	0.98	-99	4585	735	1651	6236
7	09275	262	-99	1.27	0.70	-99	7470	1790	1578	9048
7	09287	260	-99	0.99	0.55	-99	4046	3378	1927	9556
8	09175	-99	-99	-99	-99	-99	-99	-99	-99	-99
8	09197	75	-99	-99	-99	-99	-99	-99	-99	75
8	09231	375	-99	2.56	0.80	-99	2059	0	1454	3513
8	09263	318	-99	2.22	0.97	-99	4622	540	1708	6330
8	09282	296	-99	1.45	0.68	-99	6628	1258	1473	8101
8	09294	283	-99	1.04	0.57	-99	3768	3621	1680	9289
9	09175	-99	-99	-99	-99	-99	-99	-99	-99	-99
9	09197	75	-99	-99	-99	-99	-99	-99	-99	87
9	09225	354	-99	2.35	0.65	-99	1763	0	1393	3156
9	09256	294	-99	2.16	0.97	-99	5977	320	926	6903
9	09276	270	-99	1.55	0.83	-99	5844	1029	1186	7031
9	09287	270	-99	1.04	0.56	-99	2368	3697	1432	7720
10	09182	-99	-99	-99	-99	-99	-99	-99	-99	-99
10	09204	75	-99	-99	-99	-99	-99	-99	-99	64
10	09240	385	-99	1.93	0.94	-99	2429	0	1578	4007
10	09271	295	-99	1.67	0.72	-99	4842	771	1704	6545
10	09282	289	-99	1.44	0.75	-99	6095	1525	1616	7710
10	09297	291	-99	0.95	0.57	-99	3403	3658	1402	8663
11	09182	-99	-99	-99	-99	-99	-99	-99	-99	-99
11	09204	75	-99	-99	-99	-99	-99	-99	-99	65
11	09240	369	-99	1.90	1.15	-99	2317	0	1332	3648
11	09273	300	-99	1.72	0.70	-99	4840	553	1644	6484
11	09287	299	-99	1.33	0.61	-99	5673	1072	1228	6902
11	09299	300	-99	1.24	0.58	-99	3888	3738	1604	9555
12	09182	-99	-99	-99	-99	-99	-99	-99	-99	-99
12	09204	75	-99	-99	-99	-99	-99	-99	-99	61
12	09235	385	-99	1.92	1.03	-99	2443	0	1609	4052
12	09266	292	-99	1.53	0.79	-99	4133	257	1419	5551
12	09282	264	-99	1.43	0.66	-99	4817	866	1101	5918
12	09294	260	-99	1.03	0.60	-99	2196	3842	1378	7658

File Soil

```
*TH00000082  XXXX   SACL SCL      60 SANDY CLAY LOAM AT PRACHIN BURI, RANGSIT (Rs) Soil series
@SITE        COUNTRY          LAT     LONG SCS FAMILY
 PRRC        THAILAND        13.87  101.15 Fine, Mixed,Isohyperthermic
@ SCOM  SALB  SLU1  SLDR  SLRO  SLNF  SLPF  SMHB  SMPX  SMKE
     G   .13  11.5   .05    73     1     1   -99   -99   -99
@  SLB  SLMH  SLLL  SDUL  SSAT  SRGF  SSKS  SBDM  SLOC  SLCL  SLSI  SLCF  SLNI  SLHW  SLHB  SCEC  SADC
    15   -99   .19   .32   .41  1.00   .68   1.3   2.3    30    20   -99    .1     4   -99   7.5   -99
    30   -99   .19   .32   .38   .86   .68  1.46     1    30    20   -99    .1   3.8   -99   7.5   -99
    45   -99   .19   .32   .38   .25   .68   1.4    .4    30    20   -99   .04   3.2   -99   7.5   -99
    60   -99   .27   .38   .39   .10   .68  1.35    .3    30    20   -99   .04   3.2   -99   7.5   -99
```

File Weather

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*WEATHER  DATA :Prachin Buri Meteorology Station,THAILAND (WMO Index Number:    48430)
@ INSI      LAT     LONG  ELEV   TAV   AMP REFHT WNDHT
  RDPC   14.050  101.370   2.0  29.1   2.7   2.0   2.0
@DATE  SRAD  TMAX  TMIN  RAIN  DEWP  WIND   PAR
09001 10.72  29.2  22.4   0.0   -99   -99   -99
09002 13.96  29.8  22.2   0.0   -99   -99   -99
09003 15.85  30.0  19.3   0.0   -99   -99   -99
09004 17.86  33.0  20.0   0.0   -99   -99   -99
09005 18.02  34.0  20.0   0.0   -99   -99   -99
09006 17.81  33.5  21.2   0.0   -99   -99   -99
09007 17.76  33.0  19.5   0.0   -99   -99   -99
09008 17.75  32.5  20.5   0.0   -99   -99   -99
09009 15.96  29.5  20.0   0.0   -99   -99   -99
09010 14.33  26.2  17.0   0.0   -99   -99   -99
09011 16.87  27.0  16.2   0.0   -99   -99   -99
09012 17.84  28.5  16.0   0.0   -99   -99   -99
09013 17.28  28.0  18.0   0.0   -99   -99   -99
09014 16.90  27.5  16.4   0.0   -99   -99   -99
09015 17.68  28.0  16.2   0.0   -99   -99   -99
09016 17.99  29.0  17.0   0.0   -99   -99   -99
09017 18.46  30.5  16.0   0.0   -99   -99   -99
09018 18.74  31.7  16.2   0.0   -99   -99   -99
09019 18.83  32.7  17.0   0.0   -99   -99   -99
09020 18.82  33.0  18.0   0.0   -99   -99   -99
09021 18.88  33.8  18.5   0.0   -99   -99   -99
09022 18.83  34.0  20.0   0.0   -99   -99   -99
09023 18.85  34.2  19.3   0.0   -99   -99   -99
09024 18.64  33.0  20.0   0.0   -99   -99   -99
09025 18.05  32.6  22.0   0.0   -99   -99   -99
09026 18.70  34.7  21.0   0.0   -99   -99   -99
09027 18.56  34.2  22.2   0.0   -99   -99   -99
09028 18.33  34.0  22.0   0.0   -99   -99   -99
09029 18.42  34.5  23.0   0.0   -99   -99   -99
09030 18.10  34.0  22.5   0.0   -99   -99   -99
09031 17.42  32.5  22.2   0.0   -99   -99   -99
09032 18.14  33.8  23.1   0.0   -99   -99   -99
09033 18.12  33.7  22.2   0.0   -99   -99   -99
09034 18.65  34.2  22.3   0.0   -99   -99   -99
09035 18.28  33.8  23.0   0.0   -99   -99   -99
09036 18.69  34.8  23.0   0.0   -99   -99   -99
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09037	18.22	33.5	22.2	0.0	-99	-99	-99
09038	18.98	34.0	21.4	0.0	-99	-99	-99
09039	19.63	35.0	20.8	0.0	-99	-99	-99
09040	19.93	36.0	21.2	0.0	-99	-99	-99
09041	19.70	35.5	22.4	0.0	-99	-99	-99
09042	19.88	35.5	20.3	0.0	-99	-99	-99
09043	19.85	35.6	23.3	0.0	-99	-99	-99
09044	19.13	35.5	24.0	0.0	-99	-99	-99
09045	19.63	35.8	22.0	0.0	-99	-99	-99
09046	20.28	36.0	20.4	0.0	-99	-99	-99
09047	20.40	36.3	22.0	0.0	-99	-99	-99
09048	20.23	36.7	23.3	0.0	-99	-99	-99
09049	19.29	36.0	25.4	0.0	-99	-99	-99
09050	19.06	36.4	25.0	0.0	-99	-99	-99
09051	19.30	36.7	25.4	1.0	-99	-99	-99
09052	18.19	35.2	25.0	0.0	-99	-99	-99
09053	18.84	36.2	26.0	0.0	-99	-99	-99
09054	19.32	36.8	25.0	0.0	-99	-99	-99
09055	20.22	37.6	24.5	0.0	-99	-99	-99
09056	19.65	37.0	26.2	0.0	-99	-99	-99
09057	19.76	37.5	25.3	0.0	-99	-99	-99
09058	19.87	37.2	25.4	0.0	-99	-99	-99
09059	20.17	37.7	25.4	17.2	-99	-99	-99
09060	13.17	30.7	23.3	0.0	-99	-99	-99
09061	20.25	35.5	23.2	0.0	-99	-99	-99
09062	19.40	35.0	25.0	0.0	-99	-99	-99
09063	19.40	36.2	25.7	0.0	-99	-99	-99
09064	19.90	36.8	25.0	0.0	-99	-99	-99
09065	20.30	37.0	25.0	0.0	-99	-99	-99
09066	20.52	37.5	25.4	0.0	-99	-99	-99
09067	18.25	35.5	26.6	0.0	-99	-99	-99
09068	19.73	37.3	26.0	0.0	-99	-99	-99
09069	19.43	36.8	26.4	3.7	-99	-99	-99
09070	18.99	36.3	26.0	0.0	-99	-99	-99
09071	20.09	37.0	25.4	0.0	-99	-99	-99
09072	20.24	36.8	25.3	0.0	-99	-99	-99
09073	12.31	31.0	25.0	0.0	-99	-99	-99
09074	19.52	34.0	22.0	0.0	-99	-99	-99
09075	21.84	36.8	23.0	0.0	-99	-99	-99
09076	21.32	36.7	24.5	0.0	-99	-99	-99
09077	14.42	31.8	25.4	0.0	-99	-99	-99
09078	20.86	36.2	23.0	1.4	-99	-99	-99
09079	21.31	36.2	24.0	0.6	-99	-99	-99
09080	20.72	35.5	23.6	0.0	-99	-99	-99
09081	21.25	36.0	23.5	0.0	-99	-99	-99
09082	21.56	37.2	25.0	0.0	-99	-99	-99
09083	21.29	37.8	25.8	0.0	-99	-99	-99
09084	20.38	37.0	26.0	0.6	-99	-99	-99
09085	20.99	36.2	22.7	9.6	-99	-99	-99
09086	21.54	35.6	23.2	0.0	-99	-99	-99
09087	21.42	36.2	24.4	1.5	-99	-99	-99
09088	21.71	37.4	24.7	0.0	-99	-99	-99
09089	20.56	36.2	25.4	18.5	-99	-99	-99
09090	19.77	35.0	24.0	0.0	-99	-99	-99
09091	21.40	35.2	22.0	0.0	-99	-99	-99
09092	22.04	37.0	25.5	0.0	-99	-99	-99

09093	21.74	37.8	24.8	0.6	-99	-99	-99
09094	21.96	36.9	23.0	49.3	-99	-99	-99
09095	22.29	36.7	23.2	0.0	-99	-99	-99
09096	10.75	29.2	25.0	23.9	-99	-99	-99
09097	20.50	35.0	23.2	18.1	-99	-99	-99
09098	21.35	36.0	25.0	0.7	-99	-99	-99
09099	20.98	36.4	25.0	1.3	-99	-99	-99
09100	20.31	35.4	24.5	3.8	-99	-99	-99
09101	20.43	35.0	24.0	14.7	-99	-99	-99
09102	21.43	35.8	23.8	0.0	-99	-99	-99
09103	21.05	36.0	25.4	0.0	-99	-99	-99
09104	20.21	36.2	26.0	0.0	-99	-99	-99
09105	21.75	38.7	26.8	0.0	-99	-99	-99
09106	20.82	38.0	27.0	0.6	-99	-99	-99
09107	19.81	37.4	27.6	0.0	-99	-99	-99
09108	19.71	37.5	27.4	0.0	-99	-99	-99
09109	20.05	37.0	26.0	0.0	-99	-99	-99
09110	21.13	37.6	26.4	0.0	-99	-99	-99
09111	21.01	37.7	26.5	0.0	-99	-99	-99
09112	21.80	38.5	26.0	0.0	-99	-99	-99
09113	21.20	38.2	27.5	0.0	-99	-99	-99
09114	21.07	38.8	27.5	0.0	-99	-99	-99
09115	20.31	38.0	27.5	0.1	-99	-99	-99
09116	19.21	35.7	24.8	13.5	-99	-99	-99
09117	18.02	33.5	24.8	0.0	-99	-99	-99
09118	21.10	36.2	25.0	0.4	-99	-99	-99
09119	19.15	34.0	24.0	0.0	-99	-99	-99
09120	19.66	35.0	26.2	0.3	-99	-99	-99
09121	19.09	35.7	26.3	0.0	-99	-99	-99
09122	19.72	36.3	26.4	0.0	-99	-99	-99
09123	19.29	36.1	26.6	0.0	-99	-99	-99
09124	14.84	33.5	26.6	0.0	-99	-99	-99
09125	21.90	37.2	23.2	0.0	-99	-99	-99
09126	21.97	37.0	26.0	0.0	-99	-99	-99
09127	21.29	38.2	27.4	0.0	-99	-99	-99
09128	21.37	38.8	27.0	0.0	-99	-99	-99
09129	21.12	38.6	27.6	1.0	-99	-99	-99
09130	20.34	36.8	25.0	0.5	-99	-99	-99
09131	19.54	34.8	25.0	1.3	-99	-99	-99
09132	18.76	34.2	25.0	9.1	-99	-99	-99
09133	17.32	33.0	24.5	2.4	-99	-99	-99
09134	15.53	32.0	25.0	0.0	-99	-99	-99
09135	17.72	34.0	26.0	0.0	-99	-99	-99
09136	19.95	36.0	25.7	0.5	-99	-99	-99
09137	19.95	35.7	25.4	6.1	-99	-99	-99
09138	17.87	34.0	25.4	0.0	-99	-99	-99
09139	20.22	36.0	25.8	0.0	-99	-99	-99
09140	6.37	29.6	26.7	7.2	-99	-99	-99
09141	18.53	35.0	25.2	2.6	-99	-99	-99
09142	19.64	35.0	25.0	38.7	-99	-99	-99
09143	19.82	34.8	24.5	0.0	-99	-99	-99
09144	18.80	35.0	27.0	1.1	-99	-99	-99
09145	18.80	35.7	25.9	9.5	-99	-99	-99
09146	18.08	34.2	25.0	13.6	-99	-99	-99
09147	18.45	33.5	24.0	0.0	-99	-99	-99
09148	18.58	33.6	25.0	4.0	-99	-99	-99

09149	18.72	34.2	25.0	2.8	-99	-99	-99
09150	18.44	34.0	25.0	4.1	-99	-99	-99
09151	17.29	33.0	24.5	0.0	-99	-99	-99
09152	18.64	34.5	26.2	3.5	-99	-99	-99
09153	15.79	33.0	25.0	16.1	-99	-99	-99
09154	18.43	34.0	25.0	0.5	-99	-99	-99
09155	15.97	32.5	25.0	4.3	-99	-99	-99
09156	19.10	34.5	25.0	0.1	-99	-99	-99
09157	18.56	34.2	25.2	1.6	-99	-99	-99
09158	19.77	35.3	25.3	0.0	-99	-99	-99
09159	19.82	35.5	25.5	16.9	-99	-99	-99
09160	18.76	34.5	25.0	32.6	-99	-99	-99
09161	17.35	33.0	24.4	14.8	-99	-99	-99
09162	18.12	33.0	24.0	0.0	-99	-99	-99
09163	19.52	35.0	26.3	0.0	-99	-99	-99
09164	18.89	35.0	25.0	0.0	-99	-99	-99
09165	18.40	34.6	26.2	3.0	-99	-99	-99
09166	18.26	34.5	25.0	33.0	-99	-99	-99
09167	18.40	34.0	25.0	0.0	-99	-99	-99
09168	17.49	34.0	26.2	0.0	-99	-99	-99
09169	18.18	35.1	26.3	0.0	-99	-99	-99
09170	14.29	33.0	26.4	4.8	-99	-99	-99
09171	18.10	34.5	25.0	1.4	-99	-99	-99
09172	17.65	34.0	26.0	21.9	-99	-99	-99
09173	16.31	33.7	26.0	2.0	-99	-99	-99
09174	16.83	34.0	26.0	8.6	-99	-99	-99
09175	19.07	35.2	25.4	0.0	-99	-99	-99
09176	19.44	35.5	26.0	0.5	-99	-99	-99
09177	17.64	34.5	26.0	0.0	-99	-99	-99
09178	19.38	35.5	25.5	60.9	-99	-99	-99
09179	17.24	33.5	25.0	5.1	-99	-99	-99
09180	18.02	33.0	23.5	28.0	-99	-99	-99
09181	18.66	33.2	24.5	0.0	-99	-99	-99
09182	18.46	33.3	24.0	0.0	-99	-99	-99
09183	19.44	34.5	25.4	0.0	-99	-99	-99
09184	20.01	35.5	25.0	0.0	-99	-99	-99
09185	18.80	34.8	26.0	0.0	-99	-99	-99
09186	9.29	30.0	25.0	37.6	-99	-99	-99
09187	10.53	29.5	24.0	42.7	-99	-99	-99
09188	19.68	33.5	23.0	0.4	-99	-99	-99
09189	19.06	33.5	25.0	3.1	-99	-99	-99
09190	19.90	34.5	23.6	0.0	-99	-99	-99
09191	20.43	35.0	25.0	0.0	-99	-99	-99
09192	20.23	36.0	26.0	0.0	-99	-99	-99
09193	18.60	35.3	26.3	1.9	-99	-99	-99
09194	10.90	31.0	25.4	0.8	-99	-99	-99
09195	11.97	30.8	25.0	3.0	-99	-99	-99
09196	17.17	33.7	26.0	0.0	-99	-99	-99
09197	10.66	31.2	26.3	0.4	-99	-99	-99
09198	13.65	32.5	26.0	0.0	-99	-99	-99
09199	15.19	33.0	25.8	0.0	-99	-99	-99
09200	17.00	34.0	26.0	3.2	-99	-99	-99
09201	15.39	33.2	26.0	13.5	-99	-99	-99
09202	10.54	30.0	24.0	44.3	-99	-99	-99
09203	15.19	31.0	23.8	26.6	-99	-99	-99
09204	13.65	30.0	23.5	11.3	-99	-99	-99

09205	19.01	33.2	24.0	1.7	-99	-99	-99
09206	17.57	32.2	23.5	0.0	-99	-99	-99
09207	16.23	32.0	25.2	47.7	-99	-99	-99
09208	18.33	33.8	24.5	0.0	-99	-99	-99
09209	19.57	34.0	23.7	31.6	-99	-99	-99
09210	19.14	33.4	24.0	0.0	-99	-99	-99
09211	15.29	32.3	26.3	1.1	-99	-99	-99
09212	11.85	31.2	25.0	0.9	-99	-99	-99
09213	17.49	33.4	25.0	0.6	-99	-99	-99
09214	17.65	34.0	26.0	1.1	-99	-99	-99
09215	12.88	32.0	26.0	0.0	-99	-99	-99
09216	15.58	33.2	25.8	4.7	-99	-99	-99
09217	18.25	35.2	26.8	0.0	-99	-99	-99
09218	15.85	34.2	26.7	0.8	-99	-99	-99
09219	11.62	32.0	26.4	0.2	-99	-99	-99
09220	13.10	32.5	26.4	5.0	-99	-99	-99
09221	13.54	32.5	26.0	0.0	-99	-99	-99
09222	13.96	32.5	26.0	0.0	-99	-99	-99
09223	18.79	35.2	25.8	0.0	-99	-99	-99
09224	18.58	35.2	26.3	0.0	-99	-99	-99
09225	11.25	31.8	26.7	0.9	-99	-99	-99
09226	17.55	35.0	26.4	0.0	-99	-99	-99
09227	18.50	35.8	27.0	0.0	-99	-99	-99
09228	18.63	35.2	25.0	0.0	-99	-99	-99
09229	17.76	34.2	26.2	17.7	-99	-99	-99
09230	19.27	35.3	25.0	0.0	-99	-99	-99
09231	20.16	35.7	25.4	0.0	-99	-99	-99
09232	17.82	34.6	26.5	0.0	-99	-99	-99
09233	18.74	35.8	26.5	11.5	-99	-99	-99
09234	19.59	36.0	25.5	0.0	-99	-99	-99
09235	19.86	35.5	25.0	0.0	-99	-99	-99
09236	20.12	36.0	26.0	3.4	-99	-99	-99
09237	18.77	35.0	25.3	0.0	-99	-99	-99
09238	18.07	34.5	26.0	2.2	-99	-99	-99
09239	19.37	35.0	24.3	1.2	-99	-99	-99
09240	20.68	35.7	24.8	31.7	-99	-99	-99
09241	19.34	35.0	25.5	5.8	-99	-99	-99
09242	12.71	31.0	24.6	33.0	-99	-99	-99
09243	17.43	32.5	23.5	78.9	-99	-99	-99
09244	17.10	32.0	24.0	24.7	-99	-99	-99
09245	17.48	33.0	25.0	7.8	-99	-99	-99
09246	17.47	33.5	25.0	15.1	-99	-99	-99
09247	17.46	33.5	25.0	74.9	-99	-99	-99
09248	17.67	33.4	24.5	11.4	-99	-99	-99
09249	18.49	34.0	25.0	8.6	-99	-99	-99
09250	17.19	33.5	25.3	11.7	-99	-99	-99
09251	15.67	33.0	25.8	38.0	-99	-99	-99
09252	17.39	34.0	25.2	0.0	-99	-99	-99
09253	17.95	34.5	26.0	27.5	-99	-99	-99
09254	18.59	35.0	25.2	0.0	-99	-99	-99
09255	19.49	36.0	26.4	0.6	-99	-99	-99
09256	17.33	35.2	27.0	0.0	-99	-99	-99
09257	16.20	34.5	26.4	15.4	-99	-99	-99
09258	16.19	34.0	26.0	5.0	-99	-99	-99
09259	14.45	32.0	24.3	7.9	-99	-99	-99
09260	17.03	33.0	25.0	1.9	-99	-99	-99

09261	19.64	35.5	25.0	0.0	-99	-99	-99
09262	19.11	35.0	25.0	38.8	-99	-99	-99
09263	19.19	34.6	24.0	0.0	-99	-99	-99
09264	19.56	35.0	25.0	3.8	-99	-99	-99
09265	16.47	33.3	25.5	2.9	-99	-99	-99
09266	16.38	33.0	24.5	25.5	-99	-99	-99
09267	17.18	32.8	24.0	46.2	-99	-99	-99
09268	13.14	30.7	24.9	12.7	-99	-99	-99
09269	14.03	31.3	24.3	28.5	-99	-99	-99
09270	17.52	33.5	25.0	7.1	-99	-99	-99
09271	15.02	31.9	24.3	0.0	-99	-99	-99
09272	15.85	32.5	25.2	0.0	-99	-99	-99
09273	9.38	30.2	26.0	30.7	-99	-99	-99
09274	2.10	26.3	23.5	14.1	-99	-99	-99
09275	18.12	33.2	24.0	0.0	-99	-99	-99
09276	18.03	33.9	25.0	0.0	-99	-99	-99
09277	15.17	33.0	26.2	0.6	-99	-99	-99
09278	13.11	32.0	25.2	5.3	-99	-99	-99
09279	16.31	33.0	24.5	0.0	-99	-99	-99
09280	17.49	34.0	25.4	21.2	-99	-99	-99
09281	16.89	33.8	25.0	0.0	-99	-99	-99
09282	16.45	33.3	25.0	0.8	-99	-99	-99
09283	17.34	34.0	25.0	0.0	-99	-99	-99
09284	16.93	33.7	25.0	5.7	-99	-99	-99
09285	17.03	33.8	25.0	3.9	-99	-99	-99
09286	15.45	32.7	25.0	0.0	-99	-99	-99
09287	18.08	34.8	25.0	2.0	-99	-99	-99
09288	12.95	31.3	25.0	0.8	-99	-99	-99
09289	17.42	34.2	24.9	9.4	-99	-99	-99
09290	17.16	34.0	25.0	13.4	-99	-99	-99
09291	16.45	33.0	24.0	0.0	-99	-99	-99
09292	17.03	33.5	25.0	0.6	-99	-99	-99
09293	17.54	34.5	25.0	0.0	-99	-99	-99
09294	15.47	33.5	26.3	5.1	-99	-99	-99
09295	15.44	33.5	25.0	20.8	-99	-99	-99
09296	15.97	33.0	24.5	0.0	-99	-99	-99
09297	16.86	33.5	24.5	0.0	-99	-99	-99
09298	17.10	34.0	25.0	0.0	-99	-99	-99
09299	17.21	34.5	25.2	0.3	-99	-99	-99
09300	16.92	34.5	25.5	3.9	-99	-99	-99
09301	16.66	34.2	25.0	0.0	-99	-99	-99
09302	16.46	33.8	25.0	0.0	-99	-99	-99
09303	17.44	34.5	24.4	0.0	-99	-99	-99
09304	17.69	34.0	23.3	0.0	-99	-99	-99
09305	18.44	35.2	24.5	0.0	-99	-99	-99
09306	16.75	33.7	24.5	0.0	-99	-99	-99
09307	7.61	28.7	25.0	1.9	-99	-99	-99
09308	16.20	32.0	21.5	0.0	-99	-99	-99
09309	17.56	33.0	24.0	0.0	-99	-99	-99
09310	16.89	34.0	25.0	0.0	-99	-99	-99
09311	17.79	35.2	24.0	0.0	-99	-99	-99
09312	17.94	35.2	24.4	0.0	-99	-99	-99
09313	17.98	36.0	25.3	0.0	-99	-99	-99
09314	16.79	35.2	26.0	0.0	-99	-99	-99
09315	16.34	35.0	25.8	0.0	-99	-99	-99
09316	17.52	36.0	25.0	0.0	-99	-99	-99

09317	17.13	35.8	26.4	0.0	-99	-99	-99
09318	13.28	33.0	26.0	1.2	-99	-99	-99
09319	15.85	34.0	24.5	0.0	-99	-99	-99
09320	16.32	34.5	26.0	0.0	-99	-99	-99
09321	16.14	34.6	25.0	2.6	-99	-99	-99
09322	14.11	31.0	22.2	0.0	-99	-99	-99
09323	16.22	31.0	21.3	0.0	-99	-99	-99
09324	17.12	31.7	21.2	0.0	-99	-99	-99
09325	16.70	30.5	20.0	0.0	-99	-99	-99
09326	16.36	29.0	19.0	0.0	-99	-99	-99
09327	18.02	31.1	18.0	0.0	-99	-99	-99
09328	17.95	31.0	19.0	0.0	-99	-99	-99
09329	18.32	33.2	19.0	0.0	-99	-99	-99
09330	18.34	33.7	19.4	0.0	-99	-99	-99
09331	18.24	34.0	20.3	0.0	-99	-99	-99
09332	18.28	35.0	20.5	0.0	-99	-99	-99
09333	18.01	34.6	22.0	0.0	-99	-99	-99
09334	17.14	33.0	22.0	0.0	-99	-99	-99
09335	17.16	33.2	22.2	0.0	-99	-99	-99
09336	17.14	33.2	22.0	0.0	-99	-99	-99
09337	16.60	32.3	22.2	0.0	-99	-99	-99
09338	15.91	31.0	21.2	0.0	-99	-99	-99
09339	17.25	32.5	20.8	0.0	-99	-99	-99
09340	17.19	31.8	20.0	0.0	-99	-99	-99
09341	17.68	32.7	19.7	0.0	-99	-99	-99
09342	17.78	33.2	20.0	0.0	-99	-99	-99
09343	17.75	33.7	20.8	0.0	-99	-99	-99
09344	17.61	33.2	20.0	0.0	-99	-99	-99
09345	17.72	33.5	20.4	0.0	-99	-99	-99
09346	17.76	34.0	20.5	0.0	-99	-99	-99
09347	17.66	34.4	22.0	0.0	-99	-99	-99
09348	17.12	34.0	23.0	0.0	-99	-99	-99
09349	17.60	36.0	23.0	0.0	-99	-99	-99
09350	17.50	35.8	23.3	0.0	-99	-99	-99
09351	17.12	35.2	24.0	0.0	-99	-99	-99
09352	16.16	33.8	24.0	0.0	-99	-99	-99
09353	15.38	32.5	23.3	0.0	-99	-99	-99
09354	14.88	31.5	23.0	0.0	-99	-99	-99
09355	15.52	31.5	22.0	0.0	-99	-99	-99
09356	16.55	32.0	21.2	0.0	-99	-99	-99
09357	17.43	33.0	20.0	0.0	-99	-99	-99
09358	17.85	34.5	20.5	0.0	-99	-99	-99
09359	17.86	35.0	21.0	0.0	-99	-99	-99
09360	17.62	34.8	22.6	0.0	-99	-99	-99
09361	17.33	34.7	22.8	0.0	-99	-99	-99
09362	17.09	35.0	24.5	0.0	-99	-99	-99
09363	15.78	34.0	25.0	0.0	-99	-99	-99
09364	15.58	34.0	25.0	0.0	-99	-99	-99
09365	16.38	35.0	25.0	0.0	-99	-99	-99

File Genetic Coefficient

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*RICE GENOTYPE COEFFICIENTS: RICER045 MODEL
!
@VAR#  VAR-NAME..... EXPNO   ECO#    P1   P2R    P5   P20    G1    G2    G3    G4
!                                    1     2     3     4     5     6     7     8
TR0004 CHAINAT1          1,4 IB0001 518.1  25.0 445.5 11.74 46.47 .0278  1.00  1.00
TR0008 PATHUMTHANI1      1,4 IB0001 769.0  28.7 414.7 12.07 37.67 .0266  1.00  1.00
TR0009 PITSANULOKE2      1,4 IB0001 712.2  23.5 422.8  11.9 40.38 .0267  1.00  0.90
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CURRICULUM VITAE

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Education Background:

1981-1983	Diploma (Agriculture), Khon Kaen Agricultural College, Khon Kaen, Thailand
1978-1988	Diploma (Agriculture: Plant Science) Khon Kaen Agricultural College, Khon Kaen, Thailand.
1991-1992	B.Sc. (Plant Science) First Class Honour Option: Agronomy Rajamanggala Institute of Technology, Bangkok, Thailand
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1985-1994	Research Assistant, Prachin Buri Rice Research Center, Prachin Buri, Thailand
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