APPENDIX A

Input Data Files Used in the Simulation

```
*WEATHER  DATA :Mae Jo
@ INSI      LAT     LONG  ELEV   TAV   AMP REFHT WNDHT
  CM71   18.917   99.000 317.0 -99.0 -99.0 -99.0 -99.0
@DATE  SRAD  TMAX  TMIN  RAIN
01001  13.6  25.8  14.7   0.0
01002  13.2  26.3  16.7   0.0
01003  13.5  25.9  13.0   0.0
01004  15.3  27.7  13.8   0.0
01005  15.5  28.4  13.5   0.0
01006  15.1  28.4  15.7   0.0
01007  14.8  28.7  15.2   0.0
01008  14.8  28.0  14.2   0.0
01009  15.2  27.8  13.4   0.0
01010  15.5  27.7  12.8   0.0
```

Note: File naming convention (Tsuji, 1994):

DATE	Date, year + days from Jan. 1
ELEV	Elevation, m
INSI	Institute and site code
LAT	Latitude, degrees (decimals)
LONG	Longitude, degrees (decimals)
PAR	Daily photosynthetic radiation, moles m-2 day-1
RAIN	Daily rainfall (incl.snow), mm day-1
REFHT	Reference height for weather measurements, m
SRAD	Daily solar radiation, MJ m-2 day-1
TMAX	Daily temperature maximum, C
TMIN	Daily temperature minimum, C

Appendix Figure 1 The sample of Weather data file in the study

```
@VAR#  VAR-NAME........    ECO#     P1    P2R     P5    P2O     G1     G2     G3     G4
!                                    1      2      3      4      5      6      7      8
TR0001 KDML105           IB0001 502.11233.0 385.0   12.7   45.7 .0263   0.35   0.85
TR0002 NIEW SANPATONG    IB0001 495.01283.0 364.5   12.7   40.7 .0275   0.30   0.80
TR0003 RD6               IB0001 502.11233.0 385.0   12.7   45.7 .0263   0.35   0.85
TR0004 SPT1              IB0001 540.0 154.7 497.0   11.9   77.7 .0280   0.28   1.00
```

Note: File naming convention (Tsuji, 1994):

VAR#	Identification code or number for a specific cultivar.
VAR-NAME	Name of cultivar.
ECO#	Ecotype code for this cultivar points to the Ecotype in the ECO file (currently not used).
P1	Time period (expressed as growing degree days [GDD] in øC above base temperature of 9øC) from seedling emergence during which the rice plant is not responsive to changes in photoperiod. This period is also referred to as the basic vegetative phase of the
P20	Critical photoperiod or the longest day length (in hours) at which the development occurs at a maximum rate. At values higher than P20 developmental rate is slowed, hence there is delay due to longer day lengths.
P2R	Extent to which phasic development leading to panicle initiation is delayed (expressed as GDD in øC) for each hour increase in photoperiod above P20.
P5	Time period in GDD øC) from beginning of grain filling (3 to 4 days after flowering) to physiological maturity with a base temperature of 9øC.
G1	Potential spikelet number coefficient as estimated from the number of spikelets per g of main culm dry weight (less lead blades and sheaths plus spikes) at anthesis. A typical value is 55.
G2	Single grain weight (g) under ideal growing conditions, i.e. nonlimiting light, water, nutrients, and absence of pests and diseases.
G3	Tillering coefficient (scaler value) relative to IR64 cultivar under ideal conditions. A higher tillering cultivar would have coefficient greater than 1.0.
G4	Temperature tolerance coefficient. Usually 1.0 for varieties grown in normal environments. G4 for japonica type rice growing in a warmer environment would be 1.0 or greater. Likewise, the G4 value for indica type rice in very cool environments or season would be less than 1.0.

Appendix Figure 2 Genetic coefficients in the study in RICER980.CUL

```
*TH01020001  SCS          Hd      120 UNKNOWN t 102 Hang Dong IB00630001
@SITE        COUNTRY          LAT     LONG SCS FAMILY
 UNKNOWN     THAILAND      -99.000  -99.000 TYPIC TROPAQUALFS
@ SCOM  SALB  SLU1  SLDR  SLRO  SLNF  SLPF  SMHB  SMPX  SMKE
 ud     0.11   7.8  0.18    76  1.00  1.00 IB001 IB001 IB001
@  SLB SLMH   SLLL  SDUL  SSAT  SRGF  SSKS  SBDM  SLOC  SLCL  SLSI  SLCF  SLNI  SLHW  SLHB  SCEC
     7 AP    0.276 0.406 0.421  1.00 -99.0  1.44  1.79  54.0  43.7   0.0   -99   5.4   4.3  14.3
    24 AP    0.211 0.346 0.393  0.20 -99.0  1.42  1.30  39.4  54.1   0.0   -99   5.4   4.3  13.8
    29 BA    0.271 0.399 0.414  0.20 -99.0  1.42  0.54  52.9  40.6   0.0   -99   6.5   5.5  14.1
    74 BT    0.299 0.425 0.440  0.20 -99.0  1.43  0.36  59.3  35.9   0.0   -99   7.5   6.4  17.4
   120 BT    0.340 0.462 0.477  0.14 -99.0  1.44  0.26  68.4  27.8   0.0   -99   7.9   6.5  15.5
```

Note: File naming convention (Tsuji, 1994):

SCOM	=	Color, moist, Munsell hue
SALB	=	Albedo, fraction
SLU1	=	Evaporation limit, cm
SLDR	=	Drainage rate, fraction day^{-1}
SLRO	=	Runoff curve number (Soil Conservation Service)
SLNF	=	Mineralization factor, 0 to 1 scale
SLPF	=	Photosynthesis factor, 0 to 1 scale
SMHB	=	pH in buffer determination method
SMPX	=	Phosphorus, extractable, determination
SMKE	=	Potassium determination method
SLB	=	Depth, base of layer, cm
SLMH	=	Master horizon
SLLL	=	Lower limit, $cm^3\ cm^{-3}$
SDUL	=	Upper limit, drained, $cm^3\ cm^{-3}$
SSAT	=	Upper limit, saturated, $cm^3\ cm^{-3}$
SRGF	=	Root growth factor, 0.0 to 1.0
SSKS	=	Sat. hydraulic conductivity, macropore, cm h^{-1}
SBDM	=	Bulk density, moist, g cm^{-3}
SLOC	=	Organic carbon, %
SLCL	=	Clay (<0.002 mm), %
SLSI	=	Silt (0.05 to 0.002 mm), %
SLCF	=	Coarse fraction (>2 mm), %
SLNI	=	Total nitrogen, %
SLHW	=	pH in water
SLHB	=	pH in buffer
SCEC	=	Cation exchange capacity, cmol kg^{-1}
SLB	=	Depth, base of layer, cm
SLPX	=	Phosphorus, extractable, mg kg^{-1}
SLPT	=	Phosphorus, total, mg kg^{-1}
SLPO	=	Phosphorus, organic, mg kg^{-1}
SLCA	=	$CaCO_3$ content, g kg^{-1}
SLAL	=	Aluminum
SLFE	=	Iron
SLMN	=	Manganese
SLBS	=	Base saturation, cmol kg^{-1}
SLPA	=	Phosphorus isotherm A, mmol kg^{-1}
SLPB	=	Phosphorus isotherm B, mmol kg^{-1}
SLKE	=	Potassium, exchangeable, cmol kg^{-1}
SLMG	=	Magnesium, cmol kg^{-1}
SLNA	=	Sodium, cmol kg^{-1}
SLSU	=	Sulfur
SLEC	=	Electric conductivity, seimen

Appendix Figure 3.1 Soil characteristic of Hang Dong soil series in the study (SOIL.SOL file)

```
*IB00750001  SCS          Sai     110 UNKNOWN t 328 San Sai
@SITE        COUNTRY          LAT     LONG SCS FAMILY
 UNKNOWN     THAILAND      -99.000  -99.000 TYPIC TROPAQUALFS
@ SCOM  SALB  SLU1  SLDR  SLRO  SLNF  SLPF  SMHB  SMPX  SMKE
 BN     0.13  23.8  0.00    76  1.00  1.00 IB001 IB001 IB001
@  SLB SLMH   SLLL  SDUL  SSAT  SRGF  SSKS  SBDM  SLOC  SLCL  SLSI  SLCF  SLNI  SLHW  SLHB  SCEC
    17 AP    0.043 0.168 0.322  0.50 -99.0  1.65  0.60   1.5  33.5   0.0   -99   6.7   6.4   4.8
    33 AB    0.056 0.178 0.318  0.20 -99.0  1.66  0.39   4.5  27.5   0.0   -99   7.3   6.8   0.6
    48 BG    0.072 0.193 0.327  0.20 -99.0  1.63  0.09   8.0  27.5   0.0   -99   7.0   5.9   1.5
    90 BG    0.065 0.188 0.327  0.25 -99.0  1.63  0.39   6.5  29.5   0.0   -99   6.8   5.9   1.3
   110 BT    0.098 0.220 0.339  0.14 -99.0  1.59  0.08  14.0  27.0   0.0   -99   5.5   3.8   3.6
```

Note: see Figure 3.1 in Appendix A

Appendix Figure 3.2 Soil characteristic of San Sai soil series in the study (SOIL.SOL file)

```
*IB00720001  SCS          Sp      150 UNKNOWN t 314 San Pa Tong
@SITE        COUNTRY          LAT     LONG SCS FAMILY
 UNKNOWN     THAILAND      -99.000  -99.000 OXIC PALEUSTULTS
@ SCOM  SALB  SLU1  SLDR  SLRO  SLNF  SLPF  SMHB  SMPX  SMKE
 BN     0.13   8.4  0.40    76  1.00  1.00 IB001 IB001 IB001
@  SLB SLMH   SLLL  SDUL  SSAT  SRGF  SSKS  SBDM  SLOC  SLCL  SLSI  SLCF  SLNI  SLHW  SLHB  SCEC
    11 AB    0.062 0.199 0.305  0.50 -99.0  1.70  2.80   5.1  19.8   0.0   -99   4.8   4.0   5.6
    30 BT    0.081 0.198 0.317  0.20 -99.0  1.66  0.86  10.1  17.2   0.0   -99   4.9   3.9   4.2
    75 BT    0.076 0.193 0.315  0.20 -99.0  1.67  0.51   9.0  18.3   0.0   -99   4.6   3.9   3.1
   120 AP    0.085 0.200 0.317  1.00 -99.0  1.66  0.35  11.0  15.0   0.0   -99   4.8   3.9   2.5
   150 BT    0.092 0.207 0.320  0.05 -99.0  1.65  0.25  12.5  14.3   0.0   -99   4.7   3.7   2.9
```

Note: see Figure 3.1 in Appendix A

Appendix Figure 3.3 Soil characteristic of San Pa Thong soil series in the study (SOIL.SOL file)

```
*EXP.DETAILS: CMMJ0101SN EVALUATION FOR RICE FARM MANAGEMENT

*GENERAL
@PEOPLE
 MR.TEERACHART KRATAITONG
@ADDRESS
 CHIANG MAI UNIVERSITY
@NOTES
 Evaluation of Management Strategies under Risk and Uncertainty
 of Rice Production Systems

*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 KDML,LOW,HDS,RAINY        1  1  0  0  1  0  1  0  0  0  0  0  1
 2 1 0 0 KDML,MEDIUM,HDS,RAINY     1  1  0  0  1  0  2  0  0  0  0  0  1
 3 1 0 0 KDML,HIGH,HDS,RAINY       1  1  0  0  1  0  3  0  0  0  0  0  1
 4 1 0 0 MSPT,LOW,HDS,RAINY        2  1  0  0  1  0  1  0  0  0  0  0  1
 5 1 0 0 MSPT,MEDIUM,HDS,RAINY     2  1  0  0  1  0  2  0  0  0  0  0  1
 6 1 0 0 MSPT,HIGH,HDS,RAINY       2  1  0  0  1  0  3  0  0  0  0  0  1
 7 1 0 0 RD6,LOW,HDS,RAINY         3  1  0  0  1  0  1  0  0  0  0  0  3
 8 1 0 0 RD6,MEDIUM,HDS,RAINY      3  1  0  0  1  0  2  0  0  0  0  0  3
 9 1 0 0 RD6,HIGH,HDS,RAINY        3  1  0  0  1  0  3  0  0  0  0  0  3
10 1 0 0 KDML,LOW,SSS,RAINY        1  2  0  0  1  0  1  0  0  0  0  0  1
11 1 0 0 KDML,MEDIUM,SSS,RAINY     1  2  0  0  1  0  2  0  0  0  0  0  1
12 1 0 0 KDML,HIGH,SSS,RAINY       1  2  0  0  1  0  3  0  0  0  0  0  1
13 1 0 0 MSPT,LOW,SSS,RAINY        2  2  0  0  1  0  1  0  0  0  0  0  1
14 1 0 0 MSPT,MEDIUM,SSS,RAINY     2  2  0  0  1  0  2  0  0  0  0  0  1
15 1 0 0 MSPT,HIGH,SSS,RAINY       2  2  0  0  1  0  3  0  0  0  0  0  1
16 1 0 0 RD6,LOW,SSS,RAINY         3  2  0  0  1  0  1  0  0  0  0  0  3
17 1 0 0 RD6,MEDIUM,SSS,RAINY      3  2  0  0  1  0  2  0  0  0  0  0  3
18 1 0 0 RD6,HIGH,SSS,RAINY        3  2  0  0  1  0  3  0  0  0  0  0  3
19 1 0 0 KDML,LOW,SPTS,RAINY       1  3  0  0  1  0  1  0  0  0  0  0  1
20 1 0 0 KDML,MEDIUM,SPTS,RAINY    1  3  0  0  1  0  2  0  0  0  0  0  1
21 1 0 0 KDML,HIGH,SPTS,RAINY      1  3  0  0  1  0  3  0  0  0  0  0  1
22 1 0 0 MSPT,LOW,SPTS,RAINY       2  3  0  0  1  0  1  0  0  0  0  0  1
23 1 0 0 MSPT,MEDIUM,SPTS,RAINY    2  3  0  0  1  0  2  0  0  0  0  0  1
24 1 0 0 MSPT,HIGH,SPTS,RAINY      2  3  0  0  1  0  3  0  0  0  0  0  1
25 1 0 0 RD6,LOW,SPTS,RAINY        3  3  0  0  1  0  1  0  0  0  0  0  3
26 1 0 0 RD6,MEDIUM,SPTS,RAINY     3  3  0  0  1  0  2  0  0  0  0  0  3
27 1 0 0 RD6,HIGH,SPTS,RAINY       3  3  0  0  1  0  3  0  0  0  0  0  3
28 1 0 0 SPT1,LOW,HDS,DRY          4  1  0  0  2  0  4  0  0  0  0  0  2
29 1 0 0 SPT1,MEDIUM,HDS,DRY       4  1  0  0  2  0  5  0  0  0  0  0  2
30 1 0 0 SPT1,HIGH,HDS,DRY         4  1  0  0  2  0  6  0  0  0  0  0  2
31 1 0 0 SPT1,LOW,SSS,DRY          4  2  0  0  2  0  4  0  0  0  0  0  2
32 1 0 0 SPT1,MEDIUM,SSS,DRY       4  2  0  0  2  0  5  0  0  0  0  0  2
33 1 0 0 SPT1,HIGH,SSS,DRY         4  2  0  0  2  0  6  0  0  0  0  0  2
34 1 0 0 SPT1,LOW,SPTS,DRY         4  3  0  0  2  0  4  0  0  0  0  0  2
35 1 0 0 SPT1,MEDIUM,SPTS,DRY      4  3  0  0  2  0  5  0  0  0  0  0  2
36 1 0 0 SPT1,HIGH,SPTS,DRY        4  3  0  0  2  0  6  0  0  0  0  0  2
```

Note: see descriptions of headers (variables) and their values in Table 1 of appendix B

Appendix Figure 4.1 Format of input data file described different farm management strategies used in the study (Part 1)

```
*CULTIVARS
@C CR INGENO CNAME
 1 RI TR0001 KDML105
 2 RI TR0002 NIEW SANPATONG
 3 RI TR0003 RD6
 4 RI TR0004 SPT1(suparnburi)

*FIELDS
@L ID_FIELD WSTA....  FLSA  FLOB  FLDT  FLDD  FLDS  FLST SLTX  SLDP ID_SOIL
 1 CMMJ0001 CMMJ     -99.0     0 DR000     0     0 00000 -99    50 TH01020001
 2 CMMJ0001 CMMJ     -99.0     0 DR000     0     0 00000 -99    50 IB00750001
 3 CMMJ0001 CMMJ     -99.0     0 DR000     0     0 00000 -99    50 IB00720001

*PLANTING DETAILS
@P PDATE EDATE  PPOP  PPOE  PLME  PLDS  PLRS  PLRD  PLDP  PLWT  PAGE  PENV  PLPH  SPRL
 1 01215   -99  75.0  25.0     T     H    20     0   5.0     0    25  25.0   3.0   0.0
 2 01090   -99  75.0  25.0     T     H    20     0   5.0     0    25  25.0   3.0   0.0

*FERTILIZERS (INORGANIC)
@F FDATE  FMCD  FACD  FDEP  FAMN  FAMP  FAMK  FAMC  FAMO  FOCD
 1 01215 FE002 AP001    15    62   -99   -99   -99   -99   -99
 1 01259 FE005 AP001    15    19   -99   -99   -99   -99   -99
 2 01215 FE002 AP001    15   125   -99   -99   -99   -99   -99
 2 01259 FE005 AP001    15    38   -99   -99   -99   -99   -99
 3 01234 FE005 AP001    15    44   -99   -99   -99   -99   -99
 3 01264 FE005 AP001    15    44   -99   -99   -99   -99   -99
 3 01274 FE005 AP001    15    94   -99   -99   -99   -99   -99
 3 01294 FE005 AP001    15    44   -99   -99   -99   -99   -99
 4 01090 FE002 AP001    15    82   -99   -99   -99   -99   -99
 4 01129 FE005 AP001    15    25   -99   -99   -99   -99   -99
 5 01090 FE002 AP001    15   156   -99   -99   -99   -99   -99
 5 01129 FE005 AP001    15    63   -99   -99   -99   -99   -99
 6 01109 FE005 AP001    15    56   -99   -99   -99   -99   -99
 6 01139 FE005 AP001    15    56   -99   -99   -99   -99   -99
 6 01149 FE005 AP001    15   119   -99   -99   -99   -99   -99
 6 01169 FE005 AP001    15    56   -99   -99   -99   -99   -99
```

Note: see descriptions of headers (variables) and their values in Table 2 of appendix B

Appendix Figure 4.2 Format of input data file described different farm management strategies used in the study (Part 2)

```
*SIMULATION CONTROLS
@N GENERAL     NYERS NREPS START SDATE RSEED SNAME.....................
 1 GE             30     1     S 01185  2150 Rice Farm Management
@N OPTIONS     WATER NITRO SYMBI PHOSP POTAS DISES  CHEM  TILL
 1 OP              Y     Y     Y     N     N     N     N     N
@N METHODS     WTHER INCON LIGHT EVAPO INFIL PHOTO HYDRO
 1 ME              W     M     E     R     S     C     R
@N MANAGEMENT  PLANT IRRIG FERTI RESID HARVS
 1 MA              R     A     R     N     H
@N OUTPUTS     FNAME OVVEW SUMRY FROPT GROUT CAOUT WAOUT NIOUT MIOUT DIOUT  LONG CHOUT OPOUT
 1 OU              N     Y     Y     3     Y     N     Y     Y     N     N     Y     N     N

@  AUTOMATIC MANAGEMENT
@N PLANTING    PFRST PLAST PH2OL PH2OU PH2OD PSTMX PSTMN
 1 PL            180   230    40   100    30    40    10
@N IRRIGATION  IMDEP ITHRL ITHRU IROFF IMETH IRAMT IREFF
 1 IR             30    50   100 IB001 IB001    10  0.50
@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   365    75     0


@N GENERAL     NYERS NREPS START SDATE RSEED SNAME.....................
 2 GE             30     1     S 01060  2150 Rice Farm Management
@N OPTIONS     WATER NITRO SYMBI PHOSP POTAS DISES  CHEM  TILL
 2 OP              Y     Y     Y     N     N     N     N     N
@N METHODS     WTHER INCON LIGHT EVAPO INFIL PHOTO HYDRO
 2 ME              W     M     E     R     S     C     R
@N MANAGEMENT  PLANT IRRIG FERTI RESID HARVS
 2 MA              R     A     R     N     H
@N OUTPUTS     FNAME OVVEW SUMRY FROPT GROUT CAOUT WAOUT NIOUT MIOUT DIOUT  LONG CHOUT OPOUT
 2 OU              N     Y     Y     3     Y     N     Y     Y     N     N     Y     N     N

@  AUTOMATIC MANAGEMENT
@N PLANTING    PFRST PLAST PH2OL PH2OU PH2OD PSTMX PSTMN
 2 PL             60   150    40   100    30    40    10
@N IRRIGATION  IMDEP ITHRL ITHRU IROFF IMETH IRAMT IREFF
 2 IR             30    50   100 IB001 IB001    10  0.50
@N NITROGEN    NMDEP NMTHR NAMNT NCODE NAOFF
 2 NI             30    50    25 IB001 IB001
@N RESIDUES    RIPCN RTIME RIDEP
 2 RE            100     1    20
@N HARVEST     HFRST HLAST HPCNP HPCNR
 2 HA              0   365    75     0


@N GENERAL     NYERS NREPS START SDATE RSEED SNAME.....................
 3 GE             30     1     S 01185  2100 Rice Farm Management
@N OPTIONS     WATER NITRO SYMBI PHOSP POTAS DISES  CHEM  TILL
 3 OP              Y     Y     Y     N     N     N     N     N
@N METHODS     WTHER INCON LIGHT EVAPO INFIL PHOTO HYDRO
 3 ME              W     M     E     R     S     C     R
@N MANAGEMENT  PLANT IRRIG FERTI RESID HARVS
 3 MA              R     A     R     N     H
@N OUTPUTS     FNAME OVVEW SUMRY FROPT GROUT CAOUT WAOUT NIOUT MIOUT DIOUT  LONG CHOUT OPOUT
 3 OU              N     Y     Y     3     Y     N     Y     Y     N     N     Y     N     N

@  AUTOMATIC MANAGEMENT
@N PLANTING    PFRST PLAST PH2OL PH2OU PH2OD PSTMX PSTMN
 3 PL            180   230    40   100    30    40    10
@N IRRIGATION  IMDEP ITHRL ITHRU IROFF IMETH IRAMT IREFF
 3 IR             30    50   100 IB001 IB001    10  0.50
@N NITROGEN    NMDEP NMTHR NAMNT NCODE NAOFF
 3 NI             30    50    25 IB001 IB001
@N RESIDUES    RIPCN RTIME RIDEP
 3 RE            100     1    20
@N HARVEST     HFRST HLAST HPCNP HPCNR
 3 HA              0   365    75     0
```

Note: see descriptions of headers (variables) and their values in Table 3.1 – 3.2 of appendix B

Appendix Figure 4.3 Format of input data file described different farm management strategies used in the study (Part 3)

APPENDIX B

Variables and Values Descriptions of Input Data File

Appendix Table 1 Variables and values descriptions of input data file (CMMJ0101.SNX) as shown in Appendix Figure 4.1

Variable	Variable description	Value description
*EXP. DETAILS	Remark for description of experiment name and codes	User specifies exp. name and code
*GENERAL	Remark for description of names of people, addresses; name and location of experiment site(s); plot information	
PEOPLE	Names of scientists	User specifies his/her name, address and notes for his/her identification/memory
ADDRESS	Contact address of principal scientist	
NOTES	Name and location of experimental site	
*TREATMENTS	Remark for description of treatment number, name and specification of level codes of the treatment factors	
N	Treatment number	User specifies treatment number
R	Rotation number	1 = default
O	Rotation option	1 = default
C	Crop component number	0 = default
TNAME	Treatment name	User specifies detailed treatment name
CU	Cultivar level	1 -4 as defined in Appendix Table 2
FL	Field level	1-3 as defined in Appendix Table 2
SA	Soil analysis level	0 = default
IC	Initial conditions level	0 = default
MP	Planting level	1-2 as defined in Appendix Table 2
MI	Irrigation level (Method of Irrigation)	0 = default
MF	Fertilizer level	1-3 as defined in Appendix Table 2
MR	Residue level	0 = default
MC	Chemical applications level	0 = default
MT	Tillage and rotations level	0 = default
ME	Environment modifications level	0 = default
MH	Harvest level	0 = default
SM	Simulation control level	1 = For KDML and NSPT in rainy season 2 = For SPT1 in dry season 3 = For RD6 in rainy season

Note: see more detail in volume 2 of DSSAT v3

Appendix Table 2 Variables and values descriptions of input data file (CMMJ0101.SNX) as shown in Appendix Figure 4.2

Variable	Variable description	Value description
*CULTIVARS	Cultivar level, crop code, cultivar ID and name	
CU	Cultivar level	1 = KDML105 2 = NSPT 3 = RD6 4 = SPT1
CR	Crop code	RI = Rice
INGENO	Cultivar identifier	TR001 = ID code of KDML105 in RICER980.CUL TR002 = ID code of NSPT in RICER980.CUL TR003 = ID code of RD6 in RICER980.CUL TR004 = ID code of SPT1 in RICER980.CUL
CNME	Cultivar name	
*FIELDS	Specification of field level, ID, weather station name, soil, and field description details	
FL	Field level	1= Hang Dong soil series 2 = San Sai soil series 3 = San Pa Thong soil series
ID_FIELD	Field ID	
WSTA	Weather station code	CMMJ = San Sai district, Chiang Mai
FLSA	Slope and aspect	-99 = missing or unavailable data
FLOB	Obstruction to sun	
FLDT	Drainage type	
FLDD	Drain depth	
FLDS	Drain spacing	
FLST	Surface stones	
SLTX	Soil texture	-99 = missing or unavailable data
SLDP	Soil depth	
ID_SOIL	Soil ID	TH01020001 = Hang Dong soil series in SOIL.SOL IB00750001 = San Sai soil series in SOIL.SOL IB00720001 = San Pa Thong soil series in SOIL.SOL
*PLANTING DETAILS	Planting date, population, seeding depth and row spacing data	
MP	Planting level number	1 = 3 August 01 2 = 31 March 01
PDATE	Planting date	01215 = 3 August 01 01090 = 31 March 01
EDATE	Emergence date	
PPOP	Plant population at seeding	
PPOE	Plant population at emergence	
PLME	Planting method	
PLDS	Planting distribution	
PLRS	Row spacing	
PLRD	Row direction	
PLDP	Planting depth	
PLWT	Planting material dry weight	
PAGE	Transplant age	
PENV	Temperature of transplant environment	
PLPH	Plants per hill	
*FERTILIZERS	Fertilizer rate, date and type information	
MF	Fertilizer application level	1 = Low level of fertilizer management 2 = High level of fertilizer management 3 = Intensive level of fertilizer management
FDATE	Fertilization date	
FMCD	Fertilizer material	FE002 = fertilizer application of 16-20-0 FE005 = fertilizer application of 46-0-0
FACD	Fertilizer application/placement	AP001 = Broadcast, not incorporated
FDEP	Fertilizer incorporation	
FAMN	N in applied fertilizer	
FAMP	P in applied fertilizer	-99 = missing or unavailable data
FAMK	K in applied fertilizer	-99 = missing or unavailable data
FAMC	Ca in applied fertilizer	-99 = missing or unavailable data
FAMO	Other elements in applied fertilizer	-99 = missing or unavailable data
FOCD	Other element code	-99 = missing or unavailable data

Note: see more detail in volume 2 of DSSAT v3

Appendix Table 3.1 Variables and values descriptions of input data file (CMMJ0101.SNX) as shown in Appendix Figure 4.3 (Part1)

Variable	Variable description	Simulation Control		
		1	2	3
Line 1 : General				
N	Level number	1	2	3
GENERAL	Identifier	GE	GE	GE
NYERS	Runs: Years	30	30	30
NPEPS	Runs:Replications	1	1	1
START	Start of Simulation	On specified date	On specified date	On specified date
SDTE	Date	**4-Jul-01**	**1-Mar-01**	**4-Jul-01**
RSEED	Random number seed	**2150**	**2150**	**2100**
SNAME	Title	Rice Farm management	Rice Farm management	Rice Farm management
Line 2 : Option				
N	Level number	1	2	3
OPTIONS	Identifier	OP	OP	OP
WATER	Water	Yes	Yes	Yes
NITRO	Nitrogen	Yes	Yes	Yes
SYMBI	Symbiosis	Yes	Yes	Yes
PHOSP	Phosphorus	No	No	No
POTAS	Potassium	No	No	No
DISES	Diseases and other pests	No	No	No
Line 3 : Method				
N	Level number	1	2	3
METHODS	Identifier	ME	ME	ME
WTHER	Weather	Simulated data	Simulated data	Simulated data
INCON	Initial Soil Conditions	As reported	As reported	As reported
LIGHT	Light interception	Exponential with LAI	Exponential with LAI	Exponential with LAI
EVAPO	Evaporation	Ritchie modification of Priestley-Taylor	Ritchie modification of Priestley-Taylor	Ritchie modification of Priestley-Taylor
INFIL	Infiltration	Ritchie method	Ritchie method	Ritchie method
PHOTO	Photosynthesis	Radiation use efficiency	Radiation use efficiency	Radiation use efficiency
Line 4 : Management				
N	Level number	1	2	3
MANAGEMENT	Identifier	MA	MA	MA
PLANT	Planting/transplanting	On reported date	On reported date	On reported date
IRRIG	Irrigation and Water Management	Automatic when required	Automatic when required	Automatic when required
FERTI	Fertilization	On reported dates	On reported dates	On reported dates
RESID	Residue applications	No applications	No applications	No applications
HARVS	Harvest	At maturity	At maturity	At maturity
Line 5 : Outputs				
N	Level number	1	2	3
OUTPUTS	Identifier	OU	OU	OU
FNAME	Experiment	No	No	No
OVVEW	Overview	Yes	Yes	Yes
SUMRY	Summary	Yes	Yes	Yes
FROPT	Frequency of output	3	3	3
GROUT	Growth	Yes	Yes	Yes
CAOUT	Carbon	No	No	No
WAOUT	Water	Yes	Yes	Yes
NIOUT	Nitrogen	Yes	Yes	Yes
MIOUT	Phosphorous	No	No	No
DIOUT	Diseases and other pests	No	No	No
LONG	Wide or 80 column daily output	Yes	Yes	Yes

Appendix Table 3.2 Variables and values descriptions of input data file (CMMJ0101.SNX) as shown in Appendix Figure 4.3 (Part2)

Variable	Variable description	Simulation Control		
		1	2	3
AUTOMATIC MANAGEMENT				
Planting				
N	Level number	1	2	3
PLANTING	Identifier	PL	PL	PL
PFRST	Earliest	**180**	**60**	**180**
PLAST	Latest	**230**	**150**	**230**
PH20L	Lowermost soil water	40	40	40
PH20U	Uppermost soil water	100	100	100
PH20D	Management depth for water	30	30	30
PSTMX	Max. soil temp.	40	40	40
PSTMN	Min. soil temp.	10	10	10
Irrigation and Water Management				
N	Level number	1	2	3
IRRIGATION	Identifier	IR	IR	IR
IMDEP	Management depth	30	30	30
ITHRL	Threshold	50	50	50
ITHRU	End point	100	100	100
IROFF	End of applications	IB001	IB001	IB001
IMETH	Method	IB001	IB001	IB001
IRAMT	Amount per irrigation	10	10	10
IREFE	Irrigation application efficiency	0.5	0.5	0.5
Nitrogen Fertilization				
N	Level number	1	2	3
NITROGEN	Identifier	NI	NI	NI
NMDEP	Application depth	30	30	30
NMTHR	Threshold	50	50	50
NAMNT	Amount per application	25	25	25
NCODE	Material	IB001	IB001	IB001
NAOFF	End of applications	IB001	IB001	IB001
Residues				
N	Level number	1	2	3
RESIDUES	Identifier	RE	RE	RE
RIPCN	Incorporation percentage	100	100	100
RTIME	Incorporation time	1	1	1
RIDEP	Incorporation depth	20	20	20
Harvests				
N	Level number	1	2	3
HARVESTS	Identifier	HA	HA	HA
HFRST	Earliest	0	0	0
HLAST	Latest	365	365	365
HPCNP	Percentage of product harvested	75	75	75
HRCNR	Percentage of residue harvested	0	0	0

Note: see more detail in volume 2 of DSSAT v3

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