AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D. C. 20523

BIBLIOGRAPHIC INPUT SHEET

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Batch 31

1. SUBJECT CLASSIFICATION

A. PRIMARY
Agriculture — AE10-0000-0000

B. SECONDARY
Agricultural economics

2. TITLE AND SUBTITLE
Preliminary reference manual: policy analysis language (PAL)

3. AUTHOR(S)
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4. DOCUMENT DATE	5. NUMBER OF PAGES	6. ARC NUMBER
1974	20p.	ARC

7. REFERENCE ORGANIZATION NAME AND ADDRESS
Mich. State

8. SUPPLEMENTARY NOTES (Sponsoring Organization, Publishers, Availability)
(Presented at CLASS Policy Advisory Board Meeting, Mich. State Univ., 1974)

9. ABSTRACT

10. CONTROL NUMBER	11. PRICE OF DOCUMENT
PN-AAB-798	
12. DESCRIPTORS	13. PROJECT NUMBER
Programming languages	
	14. CONTRACT NUMBER
	CSD-2975 Res.
	15. TYPE OF DOCUMENT

AID 590-1 (4-74)

CSD-2975 Rev.
PN-AAB-798.

PRELIMINARY
REFERENCE MANUAL
POLICY ANALYSIS LANGUAGE
PAL

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MAY 1974

NOTATION

In the following discussion the terms used such as variable name, constant, real, integer) unless otherwise defined, have the same definition as in FORTRAN.

Information enclosed in brackets are optional and may be ommitted. Information shown using capital letters indicate key words and must appear in exactly the same form in the program.

PAL PROGRAM

A PAL program consists of a collection of statements which when executed direct a conversation between a policy analyst and the computer. During the conversation the appropriate values for parameter of the model are collected from the policy analyst and are checked to make sure they are not in violation of the model limitations. At the end of the conversation, the parameter values are supplied to the model, the model is executed, and the results (or the partial results) are presented to the policy analyst for further interaction.

A sample of a conversation is shown below. The underlined information is supplied by the policy analyst.

SAMPLE CONVERSATION I

WELCOME TO THE MICHIGAN EIGHTY-AND-FIVE PROJECTION MODEL. MI8085. MI8085 IS A CRUDE MODEL BUILT TO DEMONSTRATE THE POTENTIAL USE OF CLASS AND THE SIMULATION LANGUAGE. IT IS COMPOSED OF SIX COMPONENTS WHICH INTERACT TO PROJECT MICHIGAN AGRICULTURE TO 1985:

1) HUMAN POPULATION
2) LIVESTOCK POPULATION
3) LAND ALLOCATION
4) PRODUCTION
5) DEMAND
6) ACCOUNTING

POLICIES ARE IMPLEMENTED IN THE MODEL BY CHANGING PARAMETER VALUES, AND ARE GROUPED BY COMPONENT. DO YOU WANT TO RUN A SIMULATION?

1 YES
2 no

* 1

IN WHICH COMPONENT OR ADDITIONAL COMPONENT WOULD YOU LIKE TO PERFORM A POLICY EXPERIMENT? (SELECT ONLY ONE: YOU WILL HAVE A CHANGE LATER TO SELECT ADDITIONAL ONES.)

1 HUMAN POPULATION
2 LIVESTOCK POPULATION
3 LAND ALLOCATION
4 PRODUCTION
5 DEMAND
6 ACCOUNTING
7 NONE

* 1

TWO HUMAN POPULATION VARIABLES MAY BE EXPERIMENTED WITH--FERTILITY RATES AND OFF-FARM MIGRATION RATES. WOULD YOU LIKE TO EXPERIMENT WITH FERTILITY RATES?

1 YES
2 NO

* 1

AGE-SPECIFIC FERTILITY RATES, ASSUMING CONSTANT DEATH RATES, NORMALLY DECAY TO ZPG VALUES BY 1990 AT AN EXPONENTIAL DECAY RATE OF:

.0092

THIS IS THE DEFAULT VALUE. THE CURRENT VALUE IS:

.0192

DO YOU WANT TO CHANGE THIS CURRENT VALUE?

1 YES
2 NO

```
*,
PLEASE TYPE IN VALUE OF REAL VARIABLE  RCFRTR

* ?
RATE OF DECREASE OF HUMAN FERTILITY RAT
PLEASE TYPE IN VALUE

*.02
```

SAMPLE CONVERSATION 2

WOULD YOU LIKE TO SEE ANOTHER TABLE OF DETAILED OUTPUT FOR THE SAME RUN?

1 YES
2 NO

WHICH TABLE OF MORE DETAILED OUTPUT WOULD YOU LIKE TO SEE? SELECT ONLY ONE: OTHERS MAY BE SELECTED BY RERUNNING THE SIMULATION LATER.

1 MICHIGAN POPULATION
2 LIVESTOCK POPULATION
3 LAND ALLOCATION
4 COMMODITY PRODUCTION AND DEMAND
5 ACCOUNTING
6 NONE

* 3
WOULD YOU LIKE TO SELECT PRINT-OUT TIMES OTHER THAN 1970, 1975, 1980, AND 1985?

1 YES
2 NO

* 2
OK, HERE WE GO.
THE MODEL IS EXECUTING

STATEMENTS:

There are three types of statements in PAL. The VARIABLE statement is a declarative statement establishing the name and nature of variables that may be affected by the conversation. The TEXT and ANSWER statements are used to prescribe the conversation and the actions that are to be taken by the PAL interpreter.

VARIABLE STATEMENT

Variable statements are used to establish the name, type, dimension, and default values of the variables that may be changed by the user. It is also used to restrict the values that may be assigned to the variables.

The form of the statement is:

Vname;[n1,n2,...,nk];[t];[n];[d1,d2,...,dn];[ℓ1,ℓ2,...,ℓm]

Where:

Name is the name of the variable

n1 are text which will be printed if a (?) is entered in response to a request to supply a value for the variable. The first question mark will cause the printing of d1, the next question mark d2, etc. If more than k question marks is entered the menage.

'TYPE IN VALUE OF VARIABLE'

will be printed:

t indicates the type of the variable. It may have the value I for integer, 'R for real, ~~or~~ H-hollerith 0 to indicate the variable is local to the conversation and/or is not defined in the actual model.

n indicates the dimension of the variable. The variable may be one, two or three dimensional.

d1 default values for the variable.

ℓl A series of logical statements conforming to the rules of FORTRAN involving the variable. The value supplied for the variable must make all these statements true or it will be rejected.

TEXT STATEMENT

TEXT statement is used to present a text to the user.

The form of the statement is:

T[branch:] text

Where:

branch is a label consisting of one to four letters. It is used in the branching field of the ANSWER statements.

text is any alphanumeric string of characters. When TEXT statement is executed the text is printed.

ANSWER STATEMENT

The form of the answer statement is:

Atext; action; branch

Where:

text is a string of alphanumeric information

action is a sequence of actions; such as requesting or printing the value of a variable. The format of the action field will be covered below.

branch is a label which is defined as part of a TEXT statement.

A unit of conversation in PAL consists of a TEXT statement together with the ANSWER statements following it. The system will print the text of the TEXT statement followed by the text of each of the ANSWER statements, numbered consequtively starting with 1.

The user will enter the desired integer depending on the answer he wants. The corresponding action will then be executed and the program branches to the unit indicated in the branch field.

ACTION FIELD

I. For simple assignment

;V=n,V1=k1V2=1; where n,k, 1 are constants.

II. For single dimensioned arrays

;V=1,11,12/n/,V1=11-13 117/1,k/1g/1q/m/;

where:

n, 1, k, m are constants, 1 are indices of V-V1

III. For doubly dimensioned arrays

;V=(1,j)/1,q/,V1=(1,j1-jk),(11,j1)/n1,n2/;

Where:

1, q, n1, n2 are constants, 1, j are indices and j1-jk indicates a range of indices, V,V1 variable name.

IV. FOR USER-INPUT VALUES

; ;V1,V2(1),V3,Vr(1,j);

V. IMPLIED DO LOOP PRINTS

a) For 1-DIMENSIONAL ARRAYS:

;*V=(N-Y),(Z-X),*VI=(I-p); where single "*" indicates default value printed.

;**V=(N-Y),(Z-X)I**VI=(I-p); where double "**" indicates changed value printed.

b) For 2-DIMENSIONAL ARRAYS:

;*V=(n-y,I-p),*VI=(k,m);

;**V=(n-y,I),(m,q-p),**VI-(j,I); where "*" and "**" indicate same as above.

If *V=(n-y),(z-x) is indicated, then first n-y and then z-x elements would be printed of a single dimensional array.

If **V=(n-y,I),(m,z-x) is indicated, the same as above is printed.

Otherwise, first indicate indices as normal. (when no ranges need to be specified).

VI. CONTINUATION

Information contained in any statement type may appear in more than one card. All additional cards must contain a 'C' in the first column

SAMPLE PAL PROGRAM

```
VNAMENP,
CSM. GRAINS,DRY BEANS,SOY BEANS,HAY,CAPITAL,
CUNSK. LAB.,SK. LAB.;;
VNAMCRP;;CH;17;CORN,SM. GRAINS,VEGETABLES,FRUIT,POTATOES,
CDRY BEANS,SOY BEANS,HAY,SUGAR BEET,OTHER CROP,BEEF,DAIRY,HOGS,
CSHEEP,POULTRY MT,EGGS,HORSES;;
VI;;0I;;.;;
VJ;;0I;;.;;
VIPSLCT;PRINT SELECTION SWITCH;;;0;IPSLCT .GE. 0,IPSLCT .LE. 5;
VNPRI;NUMBER OF POINTS IN TIME TO BE PRINTED;;;4;NPRI .GE. 1,
CNPRI .LE. 6;
VTPRI;TIMES TO BE PRINTED;;6;1970.0, 1975., 1980., 1985., 0.0, 0.0;
CTPRT(1) .GE. 1970.0,
CTPRT(1) .LT. TPRT(2), TPRT(3) .LT. TPRT(4), TPRT(4) .LT. TPRT(5),
CTPRT(1) .LT. TPRT(6), TPRT(6) .LE. 1985.0, TPRT(2) .LT. TPRT(3);
VRCFRTR;RATE OF DECREASE OF HUMAN FERTILITY RATE;;;0.0092;RCFRTR
C.LE.1.;
VPMRFB;1960-1970 PROPORTIONAL OFF-FARM MIGRATION RATES BASE;;
C19,2;  0.040,  0.040,  0.009, -0.017,  0.010,  0.149,  0.103,
C      -0.017, 00.022, -0.017,    00.,  0.007,  0.012,  0.018,
C       0.029,  0.036,  0.023,  0.068,  0.071,
C       0.032,  0.032,  0.007, -0.019,  0.007,  0.149,  0.152,
C       0.006, -0.023, -0.018, -0.008, -0.003,  0.002, -0.005,
C       0.000,  0.007, -0.009,  0.054,  0.076 ; PMRFB .LE. 1.;
VVPMRF1;CHANGES IN OFF-FARM MIGRATION RATE IN SPECIFIED YEARS
CFOR AGES 0-14;;4;4R1.0;;
VVPMRF2;CHANGES IN OFF-FARM MIGRATION RATE IN SPECIFIED YEARS
CFOR AGES 15-39;;4;4R1.0;;
VVPMRF3;CHANGES IN OFF-FARM MIGRATION RATE IN SPECIFIED YEARS
CFOR AGES 40-59;;4;4R1.0;;
VVPMRF4;CHANGES IN OFF-FARM MIGRATION RATE IN SPECIFIED YEARS
CFOR AGES 60 AND OVER;;4;4R1.0;;
VARGMF1;TIMES SPECIFIED CHANGES IN BASE OFF-FARM MIGRATION RATES
COCCUR FOR AGES 0-14;;4; 1970., 1975., 1980., 1985.;ARGMF1(1) .GE. 1970.
C,ARGMF1(1) .LT. ARGMF1(2), ARGMF1(2) .LT. ARGMF1(3) , ARGMF1(3)
C.LT. ARGMF1(4),ARGMF1(4) .LE. 1985.;
VARGMF2;TIMES SPECIFIED CHANGES IN BASE OFF-FARM MIGRATION RATES
COCCUR FOR AGES 15-39;;4;  1970., 1975., 1980., 1985.;ARGMF2(1) .GE.
C1970., ARGMF2(1) .LT. ARGMF2(2) , ARGMF2(4) .LT. ARGMF2(3)
C, ARGMF2(3) .LT. ARGMF2(4),ARGMF4(2) .LE. 1985.;
VARGMF3;TIMES SPECIFIED CHAGES IN BASE OFF-FARM MIGRATION
CRATES OCCUR FOR AGES 40-59;;4; 1970., 1975., 1980., 1985.;ARGMF3(1)
C1970.
C.GE. , ARGMF3(1) .LT. ARGMF3(2) , ARGMF3(2) .LT. ARGMF3(3)
C, ARGMF3(3) .LT. ARGMF3(4),ARGMF3(4) .LE. 1985.;
VARGMF4;TIMES SPECIFIED CHANGES IN BASE OFF-FARM MIGRATION RATES OCCUR
CFOR AGES 60 AND OVER;;4;  1970., 1975., 1980., 1985.;ARGMF4(1) .GE.
C1970. , ARGMF4(1) .LT. ARGMF4(2) , ARGMF4(2) .LT.
CARGMF4(3) , ARGMF4(3) .LT. ARGMF4(4),ARGMF4(4) .LE. 1985.;
VPOPL70;LIVESTOCK POPULATION IN 1970;;7; 525000.,  0.  1200000.,
C165000.,  699000.,  5875000.,  171000.; POPL70 .GE. 0.;
VPOPL85;LIVESTOCK POPULATION IN 1985;;7; 810900.,  0.  1300000.,
C100000.,  1400000.,  5875000.,  400000.; POPL85 .GE. 0.;
VFERTDC;DIARY COW FERTILITY RATES;;3; 0.,  0.25.,  0.35;FERTDC(1) .EQ.
C0., FERTDC(2) .LE. 1. , FERTDC(3) .LE. 1.,FERTDC(2)
C .GE. 0.0,FERTDC(3) .GE. 0.0;
VCULLR;DAIRY COW CULL RATE;;3; 0.15,  0.18,  0.08; CULLR(1) .LE.1.
C, CULLR (2) .LE. 1. , CULLR(3) .LE. 1.;
VVPCDLF;PER  CAPITA DEMAND FOR NON-FARM LAND FROM THE FARM POPULATION
C IN 1970, 1975, 1980, 1985;;4;4R2.75;VPCDLF .GE. 0.0;
VVPCDLN;PER CAPITA DEMAND FOR NON-FARM LAND  FROM THE
CNON-FARM POPULATION IN 1970, 1975, 1980, 1985;;4;4R3.0;VPCDLN
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AND:TPRT(1-4)=1970.,1975.,1980.,1985./NPRT=4;BEX
TBEX:OK, HERE WE GO.
X
TBEXA:WOULD YOU LIKE TO SEE ANOTHER TABLE OF DETAILED OUTPUT FOR THE
CSAME RUNE
AYES;;ROUS
AND;;
TWOULD YOU LIKE TO MAKE ANOTHER RUN WITH ADDITIONAL POLICY
CPARAMETER CHANGESE
AND:;BFIN
AYES;;
TDO YOU WANT CHANGES YOU#VE MADE IN DEFINING THE LAST RUN RESET TO
CDEFAULT VALUES BEFORE SPECIFYING NEW CHANGES, OR
CDO YOU WANT CURRENT VALUES MAINTAINED AS THE STARTING POINT FOR
CFURTHER CHANGESE
ARESET TO DEFAULT VALUES;RESET;
AKEEP CURRENT VALUES;;BCS
TOK, ALL VALUES HAVE BEEN RESET TO DEFAULT VALUES.
A;;BCS
TBFIN: OK. WELL, IT#S BEEN FUN. HOPE TO SEE YOU AGAIN SOON.
TBEND:GOOD-BYE, AND GOOD LUCK.
END
*EOR
*EOR
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AYES;;BOS
ANO;;BCS
TBACC:FARM-GATE PRICES AND NET REVENUE TAX RATES ARE
CSET EXOGENOUSLY BY MI8085 FOR 1970 AND PROJECTED AS CONSTANT.
CTHEREFORE, THEY ARE CONSIDERED PART OF THE ACCOUNTING COMPONENT.
CWOULD YOU LIKE TO CHANGE EITHERE
AYES;;BACS
ANO;;BCS
TBACS:FOR WHICH COMMODITY OR ADDITIONAL COMMODITY WOULD YOU LIKE TO
CCHANGE EITHER FARM-GATE PRICE OR NET REVENUE TAX RATEE SELECT
CONE, YOU MAY SELECT OTHERS AFTERWARDS.
ACORN;I=1;
ASMALL GRAINS;I=2;
AVEGETABLES;I=3;
AFRUIT;I=4;
APOTATOES;I=5;
ADRY BEANS;I=6;
ASOY BEANS;I=7;
AHAY;I=8;
ASUGAR BEETS ;I=9;
ABEEF;I=11;
ADAIRY ;I=12;
AHOGS;I=13;
ASHEEP;I=14;
APOULTRY MEAT;I=15;
AEGGS;I=16;
AHORSES;I=17;
ANONE;;BCS
TDEFAULT AND CURRENT VALUES RESPECTIVELY, FOR THIS CCMMODITY
CARE (PRICE IS IN DOLLARS/LB)
C PRICE TAX RATE
A;*NAMCRP(I)/*PRP(I)/*RTAX(I)/*/*NAMCRP(I)/**PRP(I)/**RTAX(I);
TDO YOU WANT TO CHANGE THE CURRENT VALUES OF FARM-GATE PRICEE
AYES;PRP(I);
ANO;;
TDO YOU WANT TO CHANGE THE CURRENT VALUE OF NET REVENUE TAX
CRATEE
AYES;RTAX(I);
ANO;;
TDO YOU WANT TO SEE, AND POSSIBLY CHANGE, VALUES FOR OTHER
CCOMMODITIESE
AYES;;BACS
ANO;;BCS
TBOUT:SIMULATION RESULTS ARE DISPLAYED FOR UP TO SIX POINTS
CIN TIME FROM 1970 TO 1985, AT YOUR DISCRETION. THE DISPLAY WILL BE
CFOR 1970, 1975, 1980, AND 1985 UNLESS YOU CHOOSE OTHERWISE. RESULTS
CWILL BE IN TWO TABLES: A STANDARD TABLE (INCLUDING TOTAL MICHIGAN
CPOPULATION, TOTAL FARM POPULATION, NET AGRICULTURAL REVENUES
CAND A TABLE OF MORE DETAILED OUTPUT WHICH YOU MAY CHOOSE.
TBOUS:WHICH TABLE OF MORE DETAILED OUTPUT WOULD YOU LIKE TO SEEE
CSELECT ONLY ONE; OTHERS MAY BE SELECTED BY RERUNNING THE
CSIMULATION LATER.
AHUMAN POPULATION;IPSLCT=1;
ALIVESTOCK POPULATION;IPSLCT=2;
ALAND ALLOCATION;IPSLCT=3;
AAGRICULTURAL COMMODITY PRODUCTION AND DEMAND;IPSLCT=4;
AACCOUNTING;IPSLCT=5;
ANONE;IPSLCT=0;
TWOULD YOU LIKE TO SELECT PRINT-OUT TIMES OTHER THAN 1970, 1975,
C1980, AND 1985E
AYES;NPRT/TPRT(1-NPRT);BEX
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ASMALL GRAINS (AS SEED OR FEED);J=6;
ADRY BEANS (AS SEED);J=7;
ASOY BEANS (AS SEED OR FEED);J=8;
AHAY (AS SEED OR FEED);J=9;
ACAPITAL;J=10;
ASKILLED OR FAMILY LABOR;J=11;
AUNSKILLED (PRIMARILY MIGRANT)  LABOR;J=12;
TTHE DEFAULT AND CURRENT VALUES RESPECTIVELY FOR THE 1970 UNIT
CREQUIREMENT OF
A;*NAMCRP(I);
TFOR
A;*NAMINP(J);
TAND THE RATE OF CHANGE OF THAT REQUIREMENT PER UNIT
CTIME ARE (REQUIREMENTS ARE IN LBS/ACRE-YEAR FOR FERTILIZERS,
CLBS/ACRE-YEAR OR ANIMAL-YEAR FOR SEED AND FEED, DOLLARS/ACRE-YEAR
COR ANIMAL-YEAR FOR HERBICIDES AND CAPITAL, AND MAN-HOURS/ACRE-YEAR
COR ANIMAL-YEAR FOR LABOR);
C INP. REQ.  RATE OF CHNG
A;*RINP70(I,J)/*RRINP(I,J)/*/**RINP70(I,J)/**RRINP(I,J);
TWOULD YOU LIKE TO SELECT ANOTHER INPUT FOR THIS SAME COMMODITYE
AYES;;BPII
ANO;;
TWOULD YOU LIKE TO SELECT ANOTHER COMMODITYE
AYES;;BPIS
ANO;;BCS
TBDEM;PER CAPITA CONSUMPTION DEMAND FOR THE 16 AGRICULTURAL COMMODITIES
CARE PROJECTED FOR 1970, 1980, AND 1985 WITH LINEAR
CINTERPOLATION BETWEEN THESE YEARS.  NO DISTINCTION IS MADE BY AGE
COR SEX OR BETWEEN FARM AND NON-FARM POPULATIONS.
CWOULD YOU LIKE TO EXPERIMENT WITH THE PER CAPITA DEMAND VALUES.
AYES;;BDS
ANO;;BCS
TBDS;FOR WHICH COMMODITY, OR ADDITIONAL COMMODITY, WOULD YOU LIKE TO
CCHANGE DEMAND PROJECTIONSE  SELECT ONE; YOU MAY SELECT OTHERS
CWARDS
CAFT.RWARDS.
ACORN;I=1;
ASMALL GRAINS;I=2;
AVEGETABLES;I=3;
AFRUIT;I=4;
APOTATOES;I=5;
ADRY BEANS;I=6;
ASOY BEANS;I=7;
AHAY;I=8;
ASUGAR BEETS (DEMAND FOR SUGAR);I=9;
ABEEF;I=11;
ADAIRY (MILK);I=12;
AHOGS;I=13;
ASHEEP;I=14;
APOULTRY MEAT;I=15;
AEGGS;I=16;
AHORSES (DEMAND FOR RECREATIONAL HORSE SERVICES);I=17;
ANONE;;BCS
(DEFAULT AND CURRENT VALUES RESPECTIVELY FOR PER CAPITA DEMAND
CARE (IN LBS/PERSON-YEAR);
C      1970       1980       1985
A;*NAMCRP(I)/*VPCDEM(1-3,I)/*/*NAMCRP(I)/**VPCDEM(1-3,I);
TWOULD YOU LIKE TO CHANGE THESE CURRENT VALUESE
AYES;VPCDEM(1-3,I);
ANO;;
TWOULD YOU LIKE TO CHANGE VALUES FOR ADDITIONAL COMMODITIESE
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```
ACORN;I=1;BPYV
ASMALL GRAINS;I=2;BPYV
AVEGETABLES;I=3;BPYV
AFRUIT;I=4;BPYV
APOTATOES;I=5;BPYV
ADRY BEANS;I=6;BPYV
ASOY BEANS;I=7;BPYV
AHAY;I=8;BPYV
ASUGAR BEETS(YIELDS OF SUGAR);I=9;BPYV
ABEEF;I=11;BPYV
ADAIRY;I=12;BPYV
AHOGS;I=13;BPYV
ASHEEP;I=14;BPYV
APOULTRY MEAT;I=15;BPYV
AEGGS;I=16;BPYV
AHORSES;;BPYH
ANONE;;BPI
TBPYH:HORSES, AS LIVESTOCK, PRODUCE RECREATIONAL SERVICES
CONLY.  THEREFORE, THEIR ≠YIELD≠ IS BY DEFINITION 1 HORSE-YEAR OF
CSERVICES PER HORSE PER YEAR, AND SO IS NOT AVAILABLE FOR
CEXPERIMENTATION.
A;;BPYS
TBPYV:DEFAULT AND CURRENT VALUES RESPECTIVELY, FOR THIS
CCOMMODITY≠S YIELD OVER TIME (IN LBS/ACRE-YEAR FOR CROPS AND IN LBS
COF MEAT OR MILK OR EGGS/ANIMAL) ARE:
C                 1970        1980        1985
A:*NAMCRP(I)/*VYLD(1-3,I)/*/*NAMCRP(I)/**VYLD(1-3,I)/
CVYLD(1-3,I);BPYS
TBPIF:UNIT REQUIREMENTS FOR 12 INPUTS  ARE PROJECTED FOR EACH OF THE
C16 COMMODITIES.  PROJECTIONS BEGIN IN 1970 AND CHANGE LINEARLY OVER
CTIME.  WOULD YOU LIKE TO EXPERIMENT WITH EITHER 1970 VALUES OR
CRATES OF CHANGE
AYES;;BPIS
ANO;;BCS
TBPIS:FOR WHICH COMMODITY OR ADDITIONAL COMMODITYE  SELECT ONE; YOU
CWILL BE ABLE TO SELECT ADDITIONAL ONES AFTERWRDS.
CINPUT SELECTION WILL FOLLOW.
ACORN;I=1;BPII
ASMALL GRAINS;I=2;BPII
AVEGETABLES;I=3;BPII
AFRUIT;I=4;BPII
APOTATOES;I=5;BPII
ADRY BEANS;I=6;BPII
ASOY BEANS;I=7;BPII
AHAY;I=8;BPII
ASUGAR BEETS;I=9;BPII
ABEEF;I=11;BPII
ADAIRY;I=12;BPII
AHOGS;I=13;BPII
ASHEEP;I=14;BPII
APOULTRY MEAT;I=15;BPII
AEGGS;I=16;BPII
AHORSES;I=17;BPII
ANONE;;BCS
TBPII:WHICH INPUT OR ADDITIONAL INPUTE SELECT ONE; YOU MAY SELECT
CADDITIONAL ONES AFTERWARDS.
ANITROGEN FERTILIZER;J=1;
APHOSPHOROUS FERTILIZER;J=2;
APOTASSIUM FERTILIZER;J=3;
AHERBICIDES;J=4;
ACORN(AS SEED OR FEED);J=5;
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```
A;*VPCDLF(1-4)/*/**VPCDLF(1-4);
TAND FROM THE NON-FARM SECTOR:
A;*VPCDLN(1-4)/*/**VPCDLN(1-4);
TWOULD YOU LIKE TO CHANGE THE CURRENT VALUES OF THE FARM
CSECTOR DEMAND FOR NON-FARM LANDE
AYES;VPCDLF(1-4);
AND:;
TTHE NON-FARM SECTORE
AYES;VPCDLN(1-4);BLCL
AND:;BLCL
TBLNL:NON-FARM LAND DEMAND IS CONSTRAINED TO BE NO
CGREATER THAN SOME PROPORTION OF TOTAL MICHIGAN
CLAND REGARDLESS OF POPULATION LEVELS.  THE DEFAULT AND
CCURRENT VALUES, RESPECTIVELY, ARE
C
C  DEFAULT     CURRENT
A;*PLNF/**PLNF:
TDO YOU WANT TO CHANGE THE CURRENT VALUEE
AYES;PLNF;BLCL
ANO:;BLCL
TBLPC:PROPORTIONAL CROP LAND ALLOCATIONS ARE PROJECTED FOR 1970, 1980
CAND 1985 WITH LINEAR INTERPOLATIONS BETWEEN THOSE YEARS.  DEFAULT
CVALUES ARE SHOWN BELOW FOR EACH CROP.  THE  RESIDUAL IS ≠OTHER CROPS≠.
A;*NAMCRP(1)/*VPCL(1-3,1)/*/  NAMCRP(2)/*VPCL(1-3,2)/*/
C*NAMCRP(3)/*VPCL(1-3,3)/*/  NAMCRP(4)/*VPCL(1-3,4)/*/
C*NAMCRP(5)/*VPCL(1-3,5)/*/  NAMCRP(6)/*VPCL(1-3,6)/*/
C*NAMCRP(7)/*VPCL(1-3,7)/*/  NAMCRP(8)/*VPCL(1-3,8)/*/
C*NAMCRP(9)/*VPCL(1-3,9);
TAND CURRENT VALUES ARE:
A;*NAMCRP(1)/**VPCL(1-3,1)/*/*NAMCRP(2)/**VPCL(1-3,2)/*/
C*NAMCRP(3)/**VPCL(1-3,3)/*/*NAMCRP(4)/**VPCL(1-3,4)/*/
C*NAMCRP(5)/**VPCL(1-3,5)/*/*NAMCRP(6)/**VPCL(1-3,6)/*/
C*NAMCRP(7)/**VPCL(1-3,7)/*/*NAMCRP(8)/**VPCL(1-3,8)/*/
C*NAMCRP(9)/**VPCL(1-3,9);
TBPCS:FOR WHICH CROP, OR ADDITIONALL CROP, WOULD YOU LIKE TO CHANGE THE
CCURRENT VALUES OF LAND ALLOCATION PROPORTIONSE
ACORN:VPCL(1-3,1);BPCS
ASMALL GRAINS:VPCL(1-3,2);BPCS
AVEGETABLES:VPCL(1-3,3);BPCS
AFRUIT:VPCL(1-3,4);BPCS
APOTATOES:VPCL(1-3,5);BPCS
ADRY BEANS:VPCL(1-3,6);BPCS
ASOY BEANS:VPCL(1-3,7);BPCS
AHAY;VPCL(1-3,8);BPCS
ASUGAR BEETS:VPCL(1-3,9);BPCS
ANONE:;BCS
TBPRD:IN THE PRODUCTION COMPONENT YIELDS AND INPUT REQUIREMENTS FOR THE
C 16 COMMODITIES ARE AVAILABLE  FOR POLICY EXPERIMENTATION.  WOULD YOU
CLIKE TO TEST COMMODITY YIELDSE
AYES;:BPY
AND:;BPI
TBPI:WOULD YOU LIKE TO TEST COMMODITY INPUT REQUIREMENTSE
AYES;:BPIR
AND:;BCS
TBPY:COMMODITY YIELDS ARE PROJECTED FOR 1970,1980, AND 1985
CWITH LINEAR INTERPOLATIONS BETWEEN THOSE YEARS.
TBPYS:FOR WHICH COMMODITY OR ADDITIONAL COMMMODTIY WOULD YOU LIKE TO
CCHANGE THE CURRENT VALUES OF YIELD FOR 1970, 1980, AND 1985.  SELECT
CONLY ONE; YOU WILL HAVE AN OPPORTUNITY TO SELECT OTHERS AFTERWARDS.
CDEFAULT AND CURRENT VALUES WILL BE SHOWN TO YOU AFTER YOU
CSELECT A COMMODITY.
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TAND CORRESPONDING CURRENT VALUES ARE:
A;**POPL70(1)/**POPL70(3-7)/**POPL85(1)/**POPL85(3-7);
TBLCH:FOR WHICH WOULD YOU LIKE TO CHANGE THE CURRENT 1985
CVALUES  (SELECT  ONE; YOU MAY SELECT OTHERS AFTERWARDS).
ADIEF:POPL85(1);BLCH
AHOGS:POPL85(3);BLCH
ASHEEP:POPL85(4);BLCH
APOULTRY:POPL85(5);BLCH
AHENS:POPL85(6);BLCH
AHORSES:POPL85(7);BLCH
ANONE:;MODE
TBDFL:DAIRY COWS ARE MODELED IN THREE AGE COHORTS, ONE FOR HEIFERS
C(TO ABOUT AGE 2)  AND TWO FOR MATURE COWS (TO ABOUT AGE 5 AND
CTHEN TO ABOUT AGE 9.5).  THE FIRST COW COHORT HAS A LOWER
CFERTITLITY RATE AND A HIGHER CULL RATE, THUS REPRESENTING THE TIME
CTO IDENTIFY INFERTILE COWS; THE LAST COHORT, THEN, HAS A
CHIGHER FERTILITY RATE AND LOWER CULL RATE.  DEFAULT VALUES
CARE:
C
C FERTILITY  FERTILITY  FERTILITY    CULL        CULL        CULL
C COHORT 1   COHORT 2   COHORT 3    COHORT 1    COHORT 2    COHORT 3
A;*FERTDC(1-3)/*CULLR(1-3);
TAND CORRESPONDING CURRENT VALUES ARE:
A;**FERTDC(1-3)/**CULLR(1-3);
TWOULD YOU LIKE TO CHANGE CURRENT FERTILITY RATE VALUESE
AYES;FERTDC(2)/FERTDC(3);
ANO:;
TWOULD YOU LIKE TO CHANGE CURRENT CULL RATE VALUESE
AYES;CULLR(1)/CULLR(2)/CULLR(3);BCS
ANO:;BCS
TBLND:MIBDAS ALLOCATES LAND IN THE FOLLOWING MANNER:
C1)  THE DEMAND FOR NON-FARM LAND IS COMPUTED, AND AGRICULTURAL
C    LAND IS THE RESIDUAL
C2)  THE DEMAND FOR LAND FOR LIVESTOCK ENTERPRISES IS COMPUTED,
C    AND CROP LAND IS THE RESIDUAL
C3)  PROPORTIONAL ALLOCATIONS OF CROP LAND AMONG NINE COMMODITIES ARE
C    PROJECTED EXOGENOUSLY BASED ON BEST ESTIMATES,AND THE RESIDUAL
C    GOES TO ≠OTHER CROPS≠ (WHICH IS A LAND CATEGORY BUT
C    CURRENTLY IS NOT CONSIDERED A PRODUCTION OR DEMAND CATEGORY BY
C    THE MODEL).
CPOLICY TESTS MAY BE CONDUCTED ON
C1)  PER CAPITA DEMAND FOR NON-FARM LAND AND
C2)  PROPORTIONAL CROP LAND ALLOCATIONS
CWOULD YOU LIKE TO EXPERIMENT WITH PER CAPITA DEMAND FOR NON-FARM LANDE
AYES:;BLNF
ANO:;BLNC
TBLNC:WOULD YOU LIKE TO EXPERIMENT WITH THE UPPER LIMIT
CON NON-FARM LANDE
AYES:;BLNL
ANO:;BLCL
TBLCL:WOULD YOU LIKE TO EXPERIMENT WITH PROPORTIONAL CROP
CLAND ALLOCATIONS.
AYES;;BLPD
ANO:;BCS
TBLNF:BOTH THE FARM AND NON-FARM SECTORS GENERATE DEMAND FOR LAND FOR
CNON-FARM USES.  NORMALLY THE MODEL PROJECTS PER CAPITA DEMAND TO BE
CCONSTANT; BUT YOU MAY SPECIFY DIFFERENT VALUES AT 5-YEAR INTERVALS,
CAND THE MODEL WILL INTERPOLATE LINEARLY BETWEEN THOSE VALUES.
CDEFAULT AND CURRENT VALUES RESPECTIVELY, FOR PER CAPITA DEMAND
CFROM THE FARM SECTOR FOR NON-FARM LAND ARE:
C       1970        1975        1980        1985
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C   15-19       20-24       25-29       30-34       35-39
C
A;*PMRFB(5-9,1)/*/*PMRFB(5-9,2);
TDEFAULT VALUES FOR THE PROPORTION AND CORRESPONDING POINTS
CIN TIME ARE:
A;*VPMRF2(1-4)/*/*ARGMF2(1-4);
TAND CURRENT VALUES ARE:
A;**VPMRF2(1-4)/*/**ARGMF2(1-4);
TDO YOU WANT TO CHANGE THEIR CURRENT VALUESE
AYES;VPMRF2(1-4)/ARGMF2(1-4);BMGS
ANO:;BMGS
TBMGS:PROPORTIONAL MIGRATION RATE DEFAULT VALUES FOR FEMALE
CAND MALE COHORTS, RESPECTIVELY, IN THE 40-59 AGE GROUP ARE:
C
C   40-44       45-49       50-54       55-59
C
A;*PMRFB(10-13,1)/*/*PMRFB(10-13,2);
TDEFAULT VALUES FOR THE PROPORTION AND CORRESPONDING POINTS
CIN TIME ARE:
A;*VPMRF3(1-4)/*/*ARGMF3(1-4);
TAND CURRENT VALUES ARE:
A;**VPMRF3(1-4)/*/**ARGMF3(1-4);
TDO YOU WANT TO CHANGE THEIR CURRENT VALUESE
AYES;VPMRF3(1-4)/ARGMF3(1-4);BMGS
ANO:;BMGS
TBMGS:PROPORTIONAL MIGRATION RATE DEFAULT VALUES FOR FEMALE
CAND MALE COHORTS, RESPECTIVELY, IN THE 60 AND OVER AGE GROUP ARE:
C
C   60-64       65-69       70-74       75-79       80-84       85+
C
A;*PMRFB(14-19,1)/*/*PMRFB(14-19,2);
TDEFAULT VALUES FOR THE PROPORTION AND CORRESPONDING POINTS
CIN TIME ARE:
A;*VPMRF4(1-4)/*/*ARGMF4(1-4);
TAND CURRENT VALUES ARE:
A;**VPMRF4(1-4)/*/**ARGMF4(1-4);
TDO YOU WANT TO CHANGE THEIR CURRENT VALUESE
AYES;VPMRF4(1-4)/ARGMF4(1-4);BMGS
ANO:;BMGS
TBLP:THREE LIVESTOCK POPULATION VARIABLES MAY BE EXPERIMENTED WITH
C1)  SLAUGHTER RATES IN 1985 FOR BEEF, HOGS, SHEEP, AND
C    MEAT CHICKEN
C2)  DAIRY COW FERTILITY RATES
C3)  DAIRY COW CULL RATES
CWOULD YOU LIKE TO EXPERIMENT WITH 1985 POPULATIONE
AYES;;BL85
ANO:;BDCF
TBDCF:WOULD YOU LIKE  TO EXPERIMENT WITH DAIRY COW POPULATION
CPARAMETERSE
AYES;;DDF1
ANO:;BCS
TBLSE:EXCEPT FOR DAIRY COWS, WHICH ARE  MODELED WITH A
CDEMOGRAPHIC COHORT-SURVIVAL MODEL, LIVESTOCK
CSLAUGHTER RATES OR POPULATIONS ARE PROJECTED LINEARLY FROM
C1970 TO 1985, WHERE THE 1985 VALUE IS POLICY SPECIFIED.
DEFAULT 1970 AND 1985 VALUES RESPECTIVELY ARE:
C
C   BEEF        HOGS        SHEEP       POULTRY     HENS        HORSES
C SLAUGHTER  SLAUGHTER  SLAUGHTER  SLAUGHTER  POPULATION  POPULATION
C
A;*POPL70(1)/*POPL70(3-7)/*POPL85(1)/*POPL85(3-7);
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ANO;;BMG
TBMG:WOULD YOU LIKE TO EXPERIMENT WITH OFF-FARM MIGRATION RATESE
AYES;;BMGR
ANO;;BCS
TBFRT:AGE-SPECIFIC FERTILTIY RATES, ASSUMING CONSTANT
CDEATH RATES, NORMALLY DECAY TO ZPG VALUES BY 1990 AT AN
CEXPONENTIAL DECAY RATE OF:
A;*RCFRTR;
TTHIS IS THE DEFAULT VALUE.  THE CURRENT VALUE IS:
A;**RCFRTR;
TDO YOU WANT TO CHANGE THIS CURRENT VALUEE
AYES;RCFRTR;BMG
ANO;;BMG
TBMG:AGE-SEX SPECIFIC PROPORTIONAL OFF-FARM MIGRATION RATES ARE
CPROJECTED TO REMAIN CONSTANT FROM 1970 TO 1985 BASED ON THE
C1960-1970 EXPERIENCE.  THEY MAY BE MADE TIME VARYING FOR
CSPECIFIC AGE GROUPS:  0-14, 15-39, 40-59, AND 60 AND OVER.
CWOULD YOU LIKE TO HAVE AN EXPLANATION OF HOW TO DO THISE (HIGHLY
CRECOMMENDED IF YOU HAVE NOT DONE IT BEFOREE)
AYES;;
ANO;;BMGS
TAGE-SEX SPECIFIC OFF-FARM MIGRATION RATES VARY OVER TIME BY BEING
CLINEARLY INTERPOLATED BETWEEN POLICY-SPECIFIED VALUES AND POLICY-
CSPECIFIED POINTS IN TIME.  VALUES ARE A PROPORTION
COF THE 1960-1970 DEFAULT VALUES, THE PROPORTION SPECIFIED FOR EACH
CAGE GROUP BEING APPLIED TO ALL AGE-SEX COHORTS WITHIN THE GROUP.
CFOUR SUCH PROPORTIONS AND CORRESPONDING POINTS IN TIME BETWEEN
C1970 AND 1985 MUST BE SPECIFIED FOR EACH AGE GROUP SELECTED.
CFOR EXAMPLE, IF YOU WANT THE OFF-FARM MIGRATION RATES FOR THE 8
CAGE-SEX COHORTS IN THE 0-14 AGE GROUP TO BE 20 PER CENT
CGREATER THAN THE 1960-1970 VALUE BY 1974, 10 PER
CCENT GREATER BY 1976, 25 PER CENT LESS BY 1980 AND ZERO BY 1985,
CYOU WOULD TYPE 1.2 FOR VPMRF1(1), 1974 FOR ARGMF1(1),
C                1.1 FOR VPMRF1(2), 1976 FOR ARGMF1(2),
C                .75 FOR VPMRF1(3), 1980 FOR ARGMF1(3),
C                0.0 FOR VPMRF1(4), AND 1985 FOR ARGMF1(4)
TBMGS:WHICH AGE GROUP, OR ADDITIONAL AGE GROUP, WOULD YOU
CLIKE TO DO THIS FORE (SELECT ONE, YOU WILL HAVE AN OPPORTUNITY
CTO SELECT ADDITIONAL ONES AFTERWARDS.)
AAGES 0-14;;BMG1
AAGES 15-39;;BMG2
AAGES 40-59;;BMG3
AAGES 60 AND OVER;;BMG4
ANONE;;BCS
TBMG1:PROPORTIONAL MIGRATION RATE DEFAULT VALUES FOR FEMALE
CAND MALE COHORTS, RESPECTIVELY, IN THE 0-14 AGE GROUP ARE:
C
C        1-4        5-9        10-14
C
A;*PMRFB(1-4,1)/*/*PMRFB(1-4,2);
TDEFAULT VALUES FOR THE PROPORTION AND CORRESPONDING POINTS
CIN TIME ARE:
A;*VPMRF1(1-4)/*/*ARGMF1(1-4);
TAND CURRENT VALUES ARE:
A;**VPMRF1(1-4)/*/**ARGMF1(1-4);
TDO YOU WANT TO CHANGE THEIR CURRENT VALUESE
AYES;VPMRF1(1-4)/ARGMF1(1-4);BMGS
ANO;;BMGS
TBMG2:PROPORTIONAL MIGRATION RATE DEFAULT VALUES FOR FEMALE
CAND MALE COHORTS, RESPECTIVELY, IN THE 15-39 AGE GROUP ARE:
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C                 2R0.,    -1.,  7R0.,     2.,     7.,  2R0.,    0.01,
C                   0.,     1.,
C                -0.126,   -0.1,     0.,     0.,    -0.2,  -0.13,  -0.13,
C            0., 2R0., -0.333, -2., 0., -0.02, -0.01, -0.05,
C                   0.,
C                2R0.,    -2.,  4R0.,   -0.13,  9R0.
C;;
VVPCDEM;PER CAPITA CONSUMPTION DEMAND FOR AG COMMODITIES
CIN 1970, 1980, 1985;;3,17;
C                61.0,  52.0,  61.0,      164.9, 143.0, 159.4,
C               189.5, 211.0, 207.5,      212.7, 206.0, 219.8,
C               119.8, 105.0, 108.6,        6.5,   6.8,   6.0,
C                 0.0,   0.5,   1.0,        0.0,   0.0,   0.0,
C               101.4, 102.0, 102.0,        0.0,   0.0,   0.0,
C               116.0, 123.0, 166.4,      573.3, 560.0, 470.0,
C                67.9,  61.0,  69.5,        3.3,   5.0,   2.6,
C                48.8,  49.0,  64.6,       41.8,  34.0,  39.3,
C               0.020, 0.033, 0.040
C;VPCDEM .GE. 0.0;
VPRP:FARM GATE COMMODITY PRICES;;1,17;
C        0.0241,  0.0167,  0.0759,  0.0660,  0.0258,  0.1220,  0.0467,
C        0.0110,  0.0407,       0., 0.4608,  0.0584,  0.3091,  0.6048,
C        0.4040,  0.2267,    200.
C;PRP .GE. 0.0;
VRTAX:AG PROFIT TAX RATES, BY COMMODITY;;1,17;17R00.039
C;RTAX .GE. 0.0, RTAX .LE. 1.0;
VPLNF:UPPER LIMIT ON PROPORTION OF NON-FARM LAND;;;1.;PLNF
C.GE. 0.0, PLNF .LE. 1.0;
T      WELCOME TO THE MICHIGAN EIGHTY-AND-FIVE PROJECTION MODEL,
CMI8085.  MI8085 IS A CRUDE MODEL BUILT TO DEMONSTRATE THE
CPOTENTIAL USE OF CLASS AND THE SIMULATION LANGUAGE.  IT IS
CCOMPOSED OF SIX COMPONENTS WHICH INTERACT TO PROJECT MICHIGAN
CAGRICULTURE TO 1985:
C            1)  HUMAN POPULATION
C            2)  LIVESTOCK POPULATION
C            3)  LAND ALLOCATION
C            4)  PRODUCTION
C            5)  DEMAND
C            6)  ACCOUNTING
C
C      POLICIES ARE IMPLEMENTED IN THE MODEL BY CHANGING PARAMETER
CVALUES, AND ARE GROUPED BY COMPONENT.  DO YOU WANT TO RUN A
CSIMULATIONE
AYES;;RCS
AND;;
TWELL, MAYBE NEXT TIME.
A;;BEND
TBCS:IN WHICH COMPONENT OR ADDITIONAL COMPONENT WOULD YOU LIKE TO
CPERFORM A POLICY EXPERIMENTE  (SELECT ONLY ONE; YOU WILL HAVE
CA CHANCE LATER TO SELECT ADDITIONAL ONES.)
AHUMAN POPULATION;;BHP
ALIVESTOCK POPULATION;;BLP
ALAND ALLOCATION;;BLND
APRODUCTION;;BPRD
ADEMAND;;BDEM
AACCOUNTING;;BACC
AND;;;BOUT
TBHP:TWO HUMAN POPULATION VARIABLES MAY BE EXPERIMENTED WITH--
CFERTILITY RATES AND OFF-FARM MIGRATION RATES.  WOULD YOU LIKE TO
CEXPERIMENT WITH FERTILITY RATESE
AYES;;BFRT
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C.GE. 0.0;
VVPCL;PROPORTIONAL CROP LAND ALLOCATIONS IN 1970, 1980, 1985;;3,9;
C          0.1653,  0.2577,  0.2667,       0.0918,  0.1479,  0.0937,
C          0.0157,  0.0273,  0.0307,       0.0098,  0.0143,  0.0154,
C          0.0043,  0.0103,  0.0058,       0.0549,  0.0902,  0.0793,
C          0.0477,  0.0773,  0.0937,       0.1323,  0.1031,  0.1081,
C          0.0086,  0.0097,  0.0130
C;VPCL .GE. 0.0, VPCL .LE. 1.0, VPCL(1) + VPCL(2) + VPCL(3) +
CVPCL(4) + VPCL(5) + VPCL(6) + VPCL(7) + VPCL(8)
C+ VPCL(9) .EQ. 1.0;
VVYLD:COMMODITY YIELDS IN 1970, 1980,1985;;3,17;
C  3170.,  5040.,  5152.,       2520.,  3600.,  3600.,
C  3900.,  4900.,  5000.,       8962., 13730., 15220.,
C 17700., 30000., 32500.,       1260.,  1800.,  1800.,
C  1320.,  1740.,  1740.,       3960.,  7000.,  7000.,
C  4890.,  6000.,  6900.,         0.0,     0.0,     0.0,
C  551.5,  568.8,  574.5,       9350., 13000., 13500.,
C  179.6,  180.7,  181.1,       46.75,  47.24,  48.20,
C    4.5,    5.06,   5.25,        28.,  33.12,  33.75,
C     1.,      1.,     1.
C;VYLD .GE. 1.0;
VRINF70:UNIT INPUT REQUIREMENTS BY COMMODITY AND INPUT IN 1970;;17,12;
C                 70.,   30.,   10.,   50.,   79.,   40.,   40.,
C                  0.,  120.,  8R0.,
C                 50.,   75.,  150.,  150.,  118.,  100.,   50.,
C                 25.,  100.,  8R0.,
C                100.,   75.,  200.,  200.,  202.,   75.,   50.,
C                100.,  150.,  8R0.,
C                6.64,  0.92,    3.,  2.80,   10.,  6.87, 13.95,
C                3.96, 24.64,  8R0.,
C                 15.,  9R0., 1425., 3472.,  700.,   70.,   10.,
C                 30.,  650.,
C                  0.,   85.,  8R0., 1425., 1092.,  600.,   70.,
C                 10.,   30.,  650.,
C                5R0.,   45., 11R0.,
C                6R0.,   50.,  3R0.,  375.,  562.,  275.,   25.,
C                  6.,   25.,  375.,
C                7R0.,  3.98,  2R0., 3000.,10000.,    0.,  600.,
C                2R0., 6000.,
C                 18.,    8.,   60.,  154.,   40.,   16.,   16.,
C                  5.,   30.,    0.,   60.,   88.,    9.,    8.,
C                0.23,  0.22,   50.,
C                 6.5,  4.52,    5.,   17.,   26.,   5.1,   5.1,
C                7.22,   26.,    0.,   15.,   77.,    2.,    3.,
C                 0.2,  1.25,   10.,
C                2R0.,  145.,   33.,  3R0.,  3.62,  9R0.
C;VIN70 .GE. 0.0;
VRRINF;RATE OF CHANGE OF UNIT INPUT REQUIREMENTS BY
COMMODITY AND INPUT;;17,12;
C                  2., 0.666,  2R0.,    6.,    0., -0.666,    0.,
C              5.3333,   8R0.,
C                1.67,  1.67,  3R0.,  1.67,    0., 3.333, 3.333,
C                8R0.,
C                3.33,  1.67,  2R0.,   10.,  1.67,  1.67,  6.67,
C                3.33,  8R0.,
C                3R0.,   0.1, 13R0.,
C               11R0., 26.67,  3R0.,  -0.1,    0.,
C               11R0.,  6.67,  5R0.,
C               17R0.,
C               11R0.,  6.67,  2R0., -0.067,  2R0.,
C                7R0.,   0.2,  2R0.,  -40.,  -133., 5R0.,
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