A simulação da capacidade de suporte para populações agrícolas nos trópicos úmidos: Programa de Computador e Documentação

The simulation of carrying capacity for human agricultural populations in the humid tropics: Program and Documentation

por / by
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março / March 1979

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A SIMULAÇÃO DA CAPACIDADE DE SUPORTE PARA POPULAÇÕES AGRÍCOLAS NOS TRÓPICOS ÚMIDOS: PROGRAMA DE COMPUTADOR E DOCUMENTAÇÃO

THE SIMULATION OF CARRYING CAPACITY FOR HUMAN AGRICULTURAL POPULATIONS IN THE HUMID TROPICS: PROGRAM AND DOCUMENTATION

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Para o Povo da Amazônia

RESUMO

Documentação e listagens de FORTRAN são dadas para o programa de simulação de capacidade de suporte "KPROG2". O programa foi escrito como uma parte de uma investigação de capacidade de suporte para populações humanas numa parte da área de colonização da Rodovia Transamazônica. Muitos aspectos do programa foram designados para facilitar a adaptação do mesmo a outros agro-ecossistemas nos trópicos úmidos. A informação minuciosa dada aqui quanto à definição de abreviações, especificação de formatos de entrada e saída, etc. é essencial para os usuários do programa. Os valores de parâmetros de entrada usados nas execuções tipo padrão para o estudo na Transamazônica são dados como exemplos.

THE SIMULATION OF CARRYING CAPACITY FOR HUMAN AGRICULTURAL POPULATIONS IN THE HUMID TROPICS: PROGRAM AND DOCUMENTATION

ABSTRACT

Documentation and FORTRAN source listings are given for the KPROG2 carrying capacity simulation program. The program was written as a part of an investigation of human carrying capacity in a part of Brazil's Transamazon Highway Colonization Area. Many features of the program are designed to facilitate its adaptation to other agroecosystems in the humid tropics. The detailed information provided here in defining abbreviations, specifying input and output formats, etc. is essential for program users. The values of input parameters used in standard runs of the KPROG2 program in the Transamazon Highway study are given as examples.

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INTRODUÇÃO

Este volume fornece a documentação e listagens fontes FORTRAN para o programa de simulação da capacidade de suporte KPROG2. KPROG2 é um programa feito para a estimação da capacidade de suporte humana em uma parte da Área de Colonização da Rodovia Transamazônica do Brasil (Fearnside, 1978, 1979b). O programa tem diversos aspectos os quais foram planejados para facilitar a adaptação do programa a outros agro-ecossistemas dos trôpicos úmidos.

O KPROG2 calcula a probabilidade de falhas do colono como definida por vários critérios diferentes referentes aos níveis de consumo e qualidade ambiental. A capacidade de suporte, a qual é operacionalmente definida em termos de um gradiente de probabilidade de falha do colono (Fearnside, 1978, 1979a), pode ser estimada a partir destas probabilidades baseadas nos resultados de um certo número de execuções. Além das probabilidades calculadas da falha do colono, os valores de vários variáveis de estado são incluidos na saída, que fornecem informação complementar sobre o comportamento do sistema durante as execuções de simulação.

O programa KPROG2 pode ser encarado como estando dividido em quatro setores: alocação da uso da terra, produção agrícola, destinação do produto, e população. Condições de recursos iniciais são geradas primeiro, seguidas pelas iterações do modelo, o qual duplica muitos dos processos no agro-ecossistema dos colonos: recursos de terra, mão-de-obra, e capital são destinados, produção agrícola e de outros tipos é obtida, a renda é distribuída em diferentes usos incluindo consumo, e a população é alterada, produzindo assim

diferentes demandas e capacidades para distribuições de recursos subseqüentes. Informações relevantes para a capacidade de suporte são delineadas de diversas partes do agro-ecossistema e são impressas na saída, sem a própria capacidade de suporte entrar em nenhum dos cálculos do sistema.

Este trabalho contém informações que serão essenciais a qualquer um que use o programa: é intencionado como um trabalho de referência. Os dados de entrada estão definidos e os valores usados nas execuções padrões do estudo da Rodovia Transamazônica são dados como exemplos. Abreviações e códigos usados no programa são explicados. As listas e descrições apresentadas referentes ao fluxo de informações entre subprogramas são essenciais a qualquer que tente acompanhar o comportame de itens individuais. Informações dimensionais são dadas, as quais são muito úteis nas mudanças das necessidades dimensionais do programa; as listagens de fontes apresentadas estão dimensionadas para uma comunidade de 10 lotes com 100 "patches" por lote. Um "patch" é um pequeno pedaço de terra que funciona como uma unidade de terreno. Por exemplo, se um lote de 100 m^2 é dividido em 100 pedaços, cada "patch" representa 1 m^2.

O programa KPROG2 está inteiramente escrito em FORTRAN-IV do nível G. O sistema operacional utilizado foi o "Michigan Terminal System" (M.T.S.); os aspectos do M.T.S. são identificados para facilitar conversão a outros sistemas operacionais. As chamadas nas sub-rotinas do sistema M.T.S. foram reduzidas ao mínimo para facilitar tais conversões. Aspectos do "extended FORTRAN", tais como pontos de entrada múltiplas para subprogramas não foram usados.

OPERAÇÕES DO PROGRAMA MOSTRANDO RELAÇÃO DOS SUBPROGRAMAS

para o programa principal (MAIN)

ALÇA	NÍVEL	ENUNCIADO	OPERAÇÃO	ROTINA	OUTRAS ROTINAS CHAMADAS
			inicializações e entrada de dados	MAIN	
			inicializações	MEASUR	
-------	lotes				
I					
I			aquisição da terra e emprés-		
I					
I			timo para estabelecimento	LOANG	
I					
I -----	"patches"				
I I					
I I			geração de qualidade de		
I I					
I I			solo inicial	INITSQ	
I I					
I -----		101			
I					
I			população inicial (dist		
I					
I			ribuição de sexo e idade),		
I					
I			background dos primeiros		
I					
I			colonos, capital inicial	POPGEN	
I					
-------		100			
-------	anos				
I					
I			geração do tempo	WEAGEN	NODIM
I					

(OPERAÇÕES DO PROGRAMA MOSTRANDO RELAÇÃO DE SUBPROGRAMAS: PARA O PROGRAMA PRINCIPAL (MAIN), continuação

ALÇA	NÍVEL	ENUNCIADO	OPERAÇÃO	ROTINA	OUTRAS ROTINAS CHAMADAS
	(anos, continuação)				
			desenvolvimento tecnológico	TECHNO	
			doenças das culturas	CDISEA	
			preços de compra e venda	PRICES	
			alocação de uso da terra	LUALLO	(veja tabela separada)
-----	lotes				
---	"patches"				
			predição de perdas de solo através de erosão	EROSN	
			alteração do solo	SOILCH	PASTSO, VBUEFF, CBUEFF, WBUEFF
			produção do lote	LOTPRO	RIYLD, MZYLD, PSYLD, VIYLD, BMYLD, SMYLD, CAYLD, PEYLD, PAYLD, USECNT, LEARN
---		104			
			destinação do produto	PRALLO	BANK, ITPORT

(continua na página seguinte)

(OPERAÇÕES DO PROGRAMA MOSTRANDO RELAÇÃO DE SUBPROGRAMAS: PARA O PROGRAM PRINCIPAL (MAIN), continuação)

ALÇA	NÍVEL	ENUNCIADO	OPERAÇÃO	ROTINA	OUTRAS ROTINAS CHAMADAS
I I	(anos e lotes,				
I I					
I I	continuação)				
I I			destinação do produto	PRALLO	BUFFER-LOANG
I I			(continuação)	(contin	PAYBNK-CASHAL
I I				uação)	MEASUR (para dinheiro)
I I			processos populacionais	POPUL	
I I			medidas de nutrição	MEASUR	
I I			emigração de unidades		
I I			familiares, geração da	LEAVE	POPGEN
I I			população de recem chegados		
I -----		103			
I			estatísticas da área em		
I			geral, medidas da capacidade		
I			de suporte	MEASUR	
I			listagens de saída	MAIN	
I			saída de qualidade do solo	SQOUT	
-------		102			
			gráficos de saída	OUTPUT	

OPERAÇÕES DO PROGRAMA MOSTRANDO RELAÇÕES DE SUBPROGRAMAS

para sub-rotina da alocação de uso da terra (LUALLO)

ALÇA	NÍVEL	ENUNCIADO	OPERAÇÃO	ROTINA	OUTRAS ROTINAS CHAMADAS
-------	lotes				
I			estratégias de destinação de		
I			recursos	STRAT	CASHAL
I			probabilidades de usos da		
I			terra	PROBLU	
I			determinação das necessidades		
I			de subsistência	SUBSIS	
I			mão-de-obra pago	WAGE	
I			efeitos de saúde na		
I			mão-de-obra	HEALTH	
I -----	"patches"				
I I			financiamento, desmatamento	ICLEAR	IFINAN-LOANG
I I			necessidade de sementes,		
I I			estocagem e despesa para		
I I			sementes	SEEDS	IFINAN-LOANG
I I			empréstimos agrícolas	LOANG	
I I			verificações da suficiência		
I I			da mão de obra e do capital,		
I I			caça	LABOR	HUNT

(continua na página seguinte)

(OPERAÇÕES DO PROGRAMA MOSTRANDO RELAÇÃO DE SUBPROGRAMAS: PARA SUB-ROTINA DE ALOCAÇÃO DE USO DA TERRA (LUALLO), continuação)

ALÇA	NÍVEL	ENUNCIADO	OPERAÇÃO	ROTINA	OUTRAS ROTINAS CHAMADAS
I	(lotes, continuação)				
I					
I I	("patches", continuação)				
I I			alocação da terra, qualidades de queima	ALLOC	VBQ - WEABD - IDAGYR - IDAYYR - NDAYS
I I					SGBQ - WEABD - IDAGYR - IDAYYR - NDAYS
I I			manutenção das culturas perenes (apenas primeira chamada)	MAINT	
I I			totais de usos da terra	USETOT	MAXRA - WEABD
I I					
I -----		101			
I					
-------		100			

SUBPROGRAMAS EM ORDEM DE PRIMEIRA CHAMADA

1.)	MAIN	programa principal (KPROG2)
2.)	MEASUR	medidas de capacidade de suporte
3.)	LOANG	concessão de empréstimos
4.)	INITSQ	geração de qualidade do solo inicial
5.)	POPGEN	geração da população
6.)	BLOCK DATA	dados de entrada declarados
7.)	WEAGEN	geração de tempo
8.)	NODIM	número de dias no mês
9.)	TECHNO	desenvolvimento tecnológico
10.)	CDISEA	doenças das culturas
11.)	PRICES	preços de compra e venda
12.)	LUALLO	decisões de alocação de uso da terra
13.)	STRAT	estratégia de destinação de recursos
14.)	CASHAL	destinação do dinheiro
15.)	PROBLU	probabilidade de usos da terra
16.)	SUBSIS	demanda da subsistência
17.)	LABEQU	equivalente da mão-de-obra
18.)	WAGE	mão-de-obra pago
19.)	HEALTH	saúde humana
20.)	ICLEAR	desmatamento
21.)	IFINAN	financiamento
22.)	SEEDS	cálculo da necessidade de estocagem de sementes
23.)	LABOR	verificações da suficiência da mão-de-obra e do capit
24.)	HUNT	caça
25.)	ALLOC	alocação da terra

26.)	VBQ	qualidade da queima virgem
27.)	IDAGYR	dia do ano agrícola segundo o mês agrícola
28.)	IDAYYR	dia do ano agrícola segundo o mês de calendário
29.)	NDAYS	número de dias decorridos
30.)	WEABD	tempo entre as datas (condições meteorológicas)
31.)	MAINT	manutenção de culturas perenes, pastagens e animais
32.)	USETOT	totais de usos da terra
33.)	MAXRA	máximo de precipitação pluviométrica
34.)	EROSN	predição de perdas de solo através de erosão
35.)	SOILCH	alterações no solo
36.)	UNBUCH	alterações em solos não queimados
37.)	VBUEFF	efeitos da queima virgem
38.)	LOTPRO	produção do lote
39.)	RIYLD	produção do arroz
40.)	MZYLD	produção do milho
41.)	PSYLD	produção do Phaseolus
42.)	VIYLD	produção da Vigna
43.)	BMYLD	produção da mandioca brava
44.)	SMYLD	produção da macaxeira
45.)	CAYLD	produção do cacau
46.)	PEYLD	produção da pimenta
47.)	PAYLD	produção da pastagem
48.)	USECNT	contagem de usos da terra
49.)	LEARN	aprendizado sobre comportamento da alocação de uso da terra
50.)	PRALLO	destinação do produto
51.)	ITPORT	disponibilidade de transporte

52.)	BANK	empréstimos bancários
53.)	PAYBNK	pagamento dos empréstimos bancários
54.)	POPUL	população (processos demográficos)
55.)	LEAVE	substituição de colonos (fluxos migratórios)
56.)	SQOUT	saída da qualidade do solo
57.)	WBUEFF	efeito da queima de ervas daninhas
58.)	SGBQ	qualidade da queima em áreas de capoeira
59.)	CBUEFF	efeitos da queima de capoeira
60.)	PASTSO	solos sob pastagens
61.)	OUTPUT	saída das medidas da capacidade de suporte

SUBPROGRAMAS PELAS EXIGÊNCIAS DIMENSIONAIS

SUBPROGRAMS SEM MATRIZES DIMENSIONADAS PARA O NÚMERO DE LOTES E O NÚMERO DE "PATCHES"

ARAND	número distribuido uniformemente ao acaso
BLOCK DATA	dados de entrada declarados
BRAND	número distribuído normalmente ao acaso
IDAGYR	dia do ano agrícola, segundo o mês agrícola
IDAYYR	dia do ano agrícola, segundo o mês do calendário
ITPORT	viabilidade de transporte
LEARN	aprendizado no comportamento da alocação de uso da terra
MAXRA	máximo da precipitação pluviométrica
NDAYS	número de dias decorridos
NODIM	número de dias no mês
OUTPUT	saída das medidas da capacidade de suporte
PRICES	preços de compra e venda
TECHNO	desenvolvimento tecnológico
USECNT	contagem de usos da terra
WBUEFF	efeitos da queima das ervas daninhas
WEABD	tempo entre as datas (condições meteorológicas)
WEAGEN	geração do tempo

SUBPROGRAMAS COM APENAS O NÚMERO DE LOTES DIMENSIONADO

BANK	empréstimos bancários
BUFFER	proteções contra falhas dos colonos
CASHAL	destinação do dinheiro
HEALTH	sàûde humana
HUNT	caça
IFINAN	financiamento
LABEQU	equivalentes da mão-de-obra
LEAVE	substituição dos colonos (fluxo migratório)
LOANG	concessão de empréstimos
MEASUR	medidas de capacidade de suporte
PAYBNK	pagamento dos empréstimos bancários
POPGEN	geração da população
POPUL	população (processos demográficos)
PRALLO	destinação do produto
PROBLU	probabilidades de usos da terra
SEEDS	cálculo da necessidade de estocagem de sementes
STRAT	estratégia da destinação dos recursos
SUBSIS	demanda da subsistência
WAGE	mão-de-obra pago

SUBPROGRAMAS COM MATRIZES DIMENSIONADAS PARA AMBOS O NÚMERO DE LOTES E NÚMERO DE "PATCHES"

ALLOC	alocação da terra
BMYLD	produção da mandioca brava
CAYLD	produção do cacau
CBUEFF	efeitos da queima da capoeira
CDISEA	doenças das culturas
EROSN	predição de perdas do solo através de erosão
ICLEAR	desmatamento
INITSQ	geração da qualidade de solo inicial
LABOR	verificações da suficiência da mão-de-obra e do capital
LOTPRO	produção do lote
LUALLO	decisões quanto à alocação do uso da terra
MAIN	programa principal (KPROG2)
MAINT	manutenção de culturas perenes, pastagens e animais
MZYLD	produção do milho
PASTSO	solos sob pastagens
PAYLD	produção de pastagens
PEYLD	produção da pimenta
PSYLD	produção do Phaseolus
RIYLD	produção do arroz
SGBQ	qualidade da queima em áreas de capoeira
SMYLD	produção da macaxeira
SOILCH	alterações do solo
SQOUT	saída da qualidade do solo
UNBUCH	alterações em solos não queimados

MATRIZES PELAS EXIGÊNCIAS DIMENSIONAIS

MATRIZES COM APENAS O NÚMERO DE LOTES DIMENSIONADO

nome da matriz	nome da área "COMMON"
AMTLO	FIN
AREACL	COLON
CAPCON	COLON
CAPENT	COLON
CAPIT	COLON
CGOCON	COLON
CGOENT	COLON
CGOODS	COLON
EATGAM	FOOD
FAMLAB	COLON
FAMSIZ	COLON
IAVAIL	nenhum (na sub-rotina LUALLO)
ICAT	nenhum (na função ICLEAR)
IDONE	nenhum (na função ICLEAR)
IFEM	POP
IHUNT	GAME
IORIG	COLON
ISOLV	FIN
LABPAT	WAGELA
LOANDA	FIN
LOANTY	FIN
LUPAT	COLON
MALE	POP

nome da matriz	nome da área "COMMON"
MALES	POP
MARIT	POP
MORTYP	COLON
PDEP	POP
SEEDST	PROD

MATRIZES COM AMBOS O NÚMERO DE LOTES E "PATCHES" DIMENSIONADOS

nome da matriz	nome da área "COMMON"
AL	SOIL
BUQUAL	BURNS
BUTYP	BURNS
CARB	SOIL
CLAY	SOIL
CONTIN	USECOM
DAYSAC	UTCOM
DAYSBA	UTCOM
DAYSFA	UTCOM
DAYSPA	UTCOM
DAYSTC	UTCOM
IBPOD	DISEA
IDUR	USECOM
IFERT	FERT
IFUSAR	DISEA
IWBROO	DISEA
LASTUS	USECOM
LUMAXR	UTCOM

nome da matriz	nome da área "COMMON"
LUSE	USECOM
NITRO	SOIL
PH	SOIL
PHOS	SOIL
RAINAC	UTCOM
RAINBA	UTCOM
SLOPE	SOIL
VIRGSO	HISTOR

Nota: Valores de LTSMAX (máximo número de lotes) e NPMAX (máximo número de "patches") também devem ser fixados na rotina MAIN.

ÁREAS COMMON COM VARIÁVEIS E DIMENSÕES

COMMON	Variáveis	Dimensões	Índices	Subprogramas
AREAS	AREA	10	usos da terra (códigos "USEPR")	PRALLO, LOTPRO, MAIN
BEFORE	PHBEFF			CBUEFF, SOILCH,
	ALBEFF			VBUEFF, WBUEFF
	CBEFF			
	RNBEFF			
	PBEFF			
BQCALL	LLOTV			MAIN, VBQ, SGBQ
	LYRV			
	LLOTSG			
	LYRSG			
	LLOTW			
	LYRW			
BUCHNG	PHCH			CBUEFF, SOILCH,
	ALCH			VBUEFF, WBUEFF
	PCH			
	RNCH			
BUPROB	BURNPR	3	tipos de queima	MAIN, ALLOC
BURNS	BUTYP	10, 100	lotes, "patches"	CBUEFF, SGBQ, SOILCH, VBQ,
	BUQUAL	10, 100	lotes, "patches"	VBUEFF, LUALLO, ALLOC
CASHPR	PRINME	4	tipos de colonos	CASHAL, STRAT, WAGE
	PRINSD	4	tipos de colonos	

COMMON	Variáveis	Dimensões	Índices	Subprogramas
CASHPR	PILOME			
(continuação)	PILOSD			
	PRCG	3, 4	categorias de dinheiro, tipos de colono	
COLON	LUPAT	10	lotes	BANK, BUFFER,
	CAPIT	10	lotes	CASHAL, HEALTH,
	CGOODS	10	lotes	HUNT, IFINAN, LEAVE,
	AREACL	10	lotes	LABEQU, LABOR, LOANG,
	FAMLAB	10	lotes	LUALLO, MAIN, MAINT,
	MALES	10	lotes	MEASUR, POPGEN, POPUL,
	FAMSIZ	10	lotes	PRALLO, PROBLU, STRAT,
	CGOENT	10	lotes	SUBSIS, WAGE, ICLEAR
	CAPCON	10	lotes	
	MORTYP	10	lotes	
	IORIG	10	lotes	
	CGOCON	10	lotes	
	CAPENT	10	lotes	
COSTS	COLAB	12	meses de calendário	LABOR, MAINT, PRALLO,
	BUYME	17	produtos	PRICES, SEEDS, MAIN,
	BUYSD	17	produtos	SUBSIS
	SELLME	17	produtos	
	SELLSD	17	produtos	

COMMON	Variáveis	Dimensões	Índices	Subprogramas
DATE	IYR			BANK, BUFFER, CAYLD, CDISEA, HUNT, IDAGYR, IFINAN, ITPORT, LABOR, LEARN, LOANG, MAIN, MEASUR, NODIM, PEYLD, PRALLO, SEEDS, SGBQ, STRAT, SUBSIS, TECHNO, USETOT, VBQ, WEABD, SQOUT
DEMAND	HARI			SUBSIS, LUALLO, LABOR
	HAMZ			
	HABE			
	HAMN			
DETERM	ISTOCH			ALLOC, LUALLO, MAIN, STRAT
DISEA	PINFEC	3, 2	doenças, categorias de estabelecimento das doenças	CAYLD, CDISEA, MAIN, PEYLD
	LSPORE	3	doenças	
	IBPOD	10, 100	lotes, "patches"	
	IWBROO	10, 100	lotes, "patches"	
	IFUSAR	10, 100	lotes, "patches"	
	IWBEST			
	IFUEST			
	IBPEST			

COMMON	Variáveis	Dimensões	Índices	Subprogramas
DISEA	FUMULT			
(continu	PRDIES	3	doenças	
ação)				
EROCOM	EROS			EROSN, VBUEFF
EXPECT	EYSUM	6	culturas	LEARN, SUBSIS
	EYNUM	6	culturas	
	EYSSQ	6	culturas	
FERT	ELLIM	2	elementos	MAIN, MAINT, PEYLD,
	DOSECA	4, 2, 3	elementos, níveis de nutrientes nos solos, classes anuais	SOILCH
	DOSEPE	4, 2, 4	elementos, níveis de nutrientes nos solos, classes anuais	
	PRICFE	5	adubos	
	PFERT	2	culturas perenes	
	SLOLI			
	CONSLI			
	ALLIME			
	SLOPHO			
	CONPHO			
	IFERT	10, 100	lotes, "patches"	

COMMON	Variáveis	Dimensões	Índices	Subprogramas
FICOST	FINLSD			LOANG, MAIN
	FINLME			
	FICOSD			
	FICOME			
	PRFINL	12	meses do calendário	
FIN	ISOLV	10	lotes	BANK, BUFFER, IFINAN,
	DUEPRI	20	número máximo de empréstimos	LEAVE, LOANG, MAIN, PAYBNK, PRALLO
	DUEINT	20	número máximo de empréstimos	
	AMTLO	10, 20	lotes ,número máximo de empréstimos	
	LOANDA	10, 20	lotes, número máximo de empréstimos	
	LOANTY	10, 20	lote, número máximo de empréstimos	
	MAXNLO			
	RAINFL			
FINPCH	FINPC			IFINAN, LOANG

COMMON	Variáveis	Dimensões	Índices	Subprogramas
FLAB	FLTOT	12	meses de calendário	HEALTH, HUNT, LABOR, LOANG, LUALLO, MAINT, WAGE
	FLMALE	12	meses de calendário	
	LABCAL			
FOOD	EAT	17	produtos	HUNT, POPUL, PRALLO, MAIN
	SUBNCH			
	EATGAM	10	lotes	
FPROBS	PRFIN	12	tipos de empréstimos	BUFFER, IFINAN, MAIN
	SMEAT			HUNT, LEAVE, MAIN,
	IHUNT	10	lotes	PRALLO, STRAT
	PHUNT			
	IENDHU			
	EFFORT	12	meses de calendário	
	YLDSLO			
	YLDINT			
	EFFSLO			
	GWASTE			
HISTOR	VIRGSO	10, 100	lotes, "patches"	INITSQ, LUALLO, PSYLD
INTERP	PRI			ALLOC, MAIN
	PRIMZ			
	PRIBM			
	PRISM			
	PRIMZS			

COMMON	Variáveis	Dimensões	Índices	Subprogramas
	PRIPA			
	PRPS			
	PRVI			
	PRBM			
	PRBMRI			
	PRBMMZ			
	PRSM			
	PRSMRI			
	PRSMMZ			
	PRIMZB			
KMEAS	CALOPC			MEASUR, POPUL
	PROTPC			
	ANPRPC			
LOANS	PCINT1	12	tipos de empréstimos	BANK, IFINAN, LOANG, LUALLO, MAIN, INCLEAR
	PCINT2	12	tipos de empréstimos	
	MONCOR	12	tipos de empréstimos	
	IPERIO	12	tipos de empréstimos	
	IGRACE	12	tipos de empréstimos	
	AMTPHA	12	tipos de empréstimos	
	HAFIME	12	tipos de empréstimos	

COMMON	Variáveis	Dimensões	Índices	Subprogramas
LOANS (continuação)	HAFISD	12	tipos de empréstimos	
	IBEGYR	12	tipos de empréstimos	
	IENDYR	12	tipos de empréstimos	
LUOUT	USEOUT	3, 12	idens, códigos de usos da terra (códigos "LUOUT")	MAIN, USECNT
	LOTUSE	12	códigos de usos da terra (códigos "LUOUT")	
MATRIX	PROB	7, 7, 2	classes de após a mudança, classes de antes da mudança, distâncias	INITSQ, MAIN
MISC	SMTYPR			LUALLO, MAIN
	VITYPR			
MOWEA	SDRAIN	12	meses de calendário	BLOCK DATA, WEAGEN
	SDEVAP	12	meses de calendário	
	SDINSO	12	meses de calendário	

COMMON	Variáveis	Dimensões	Índices	Subprogramas
NEED	SUKGRI			HUNT, PRALLO, SUBSIS
	SUKGMZ			
	SUKGBE			
	SUKGMN			
	SUCASH			
	ZCRISK			
	SUKGMT			
NUTRI	CALOR	17	produtos	MAIN, POPUL
	TOTPRO	17	produtos	
	ANIPRO	17	produtos	
OUTSID	PCRECD			MAIN, PRALLO
	CRECME			
	CRECSD			
	PCSENT			
	CSENME			
	CSENSD			
PASTUR	BASEPY			PAYLD, MAIN
	YREFF	5	classes anuais	
	PACOEF			
	PACONS			
	PACHIP			
	WGPTDN			
	TDNPDM			

COMMON	Variáveis	Dimensões	Índices	Subprogramas
POP	MALE	10, 86	lotes, idades	HEALTH, LEAVE, LABEQU,
	IFEM	10, 86	lotes, idades	MAIN, POPGEN, POPUL
	FAMSTR	10, 2	idens, categorias de colonos em termos de originalidade (pioneiros ou não)	
	PDEP	86, 2	idades, categorias de colonos em termos de originalidade (pioneiros ou não)	
	FLEQUI	2, 5	sexos, classes etárias de mão-de-obra	
	PDEATH	2, 86	sexos, idades	
	PINDEM	2, 86	sexos, idades	
	PINDIM.			
	PBIRTH	44	idades	
	CALAGE	8	classes etárias para o fator calórico	
	PROAGE	19	classes etárias para o fator proteico	

COMMON	Variáveis	Dimensões	Índices	Subprogramas
POP	MARIT	10	lotes	
(contin	PMARRY			
uação)	AGBRME			
	AGBRSD			
	PMIMIG			
	PRIMAG	2, 86	sexos, idades	
	CALREQ	25	classes etárias para exigências calóricas	
	PROREQ	8	classes etárias para exigências proteicas	
PRALCO	PSELLB	10	produtos	MAIN, PRALLO
	PRVOLP			
	PPLPAY			
	TRANME			
	TRANSD			
	BTRCME			
	BTRCSD			
	CHICMZ			
	CWASTE			
PRIC	YRBUPR	17	produtos	HUNT, PRALLO, PRICES,
	YRSEPR	17	produtos	SEEDS, SUBSIS

COMMON	Variáveis	Dimensões	Índices	Subprogramas
PROD	PRES	17	produtos	LOTPRO, LUALLO, MAIN,
	SEEDST	10, 4	lotes,culturas tipo sementes	PRALLO, SEEDS
	SEED	4	culturas tipo sementes	
RANDOM	INIT			ALLOC, BUFFER, CBUEFF, CDISEA, HEALTH, ICLEAR, INITSQ, ITPORT, LEAVE, LUALLO, MAIN, MAINT, MZYLD, POPGEN, POPUL, PRALLO, PSYLD, RIYLD, SGBQ, STRAT, VBQ, VIYLD, UNBUCH, WBUEFF
REQUIR	REQTL	12, 15	meses de calendário, operações	LABOR, MAIN, MAINT, SUBSIS
	REQML	12, 15	meses de calendário, operações	
	REQFC	12, 15	meses de calendário, operações	
SEEDNE	SEEDN			LUALLO, SEEDS
	SEEDCN			
	ISCALL			

COMMON	Variáveis	Dimensões	Índices	Subprograms
SICK	DALOME	3	doenças	HEALTH, MAIN
	DALOSD	3	doenças	
	PDISEA	3, 2, 13	doenças, sexos, classes etárias para doenças	
	PDISMO	3, 12	doenças, meses de calendário	
SIZES	LOTS			CDISEA, ICLEAR, IFINAN
	NOPCHS			LABOR, LOANG, LOTPRO,
	SIZLOT			LUALLO, MAIN, MAINT,
	SIZPCH			MEASUR, SEEDS, STRAT, SQOUT
SOIL	PHOS	10, 100	lotes, "patches"	BMYLD, CAYLD, CBUEFF,
	PH	10, 100	lotes, "patches"	EROSN, INITSQ, MAIN,
	AL	10, 100	lotes, "patches"	MAINT, MZYLD, PAYLD,
	NITRO	10, 100	lotes, "patches"	PEYLD, PSYLD, RIYLD,
	CARB	10, 100	lotes, "patches"	SMYLD, SOILCH, UNBUCH,
	CLAY	10, 100	lotes, "patches"	VIYLD, VBUEFF, PASTSO,
	SLOPE	10, 100	lotes, "patches"	SQOUT
SPOIL	ESPOIL	10	produtos	MAIN, PRALLO, SUBSIS
	SPOIME	10	produtos	
	SPOISD	10	produtos	
	SPOISME	10	produtos	
	SPOISSD	10	produtos	

COMMON	Variáveis	Dimensões	Índices	Subprogramas
STAND	CALMIN			MAIN, MEASUR, OUTPUT
	PROMIN			
	ANPMIN			
	CHPFMI			
	CHPCMI			
	CLLMAX			
	STDRD	14, 50	itens, anos de simulação	
SUMMAR	FAILED			MAIN, MEASUR
TECHN	TECH	9	culturas	BMYLD, CAYLD, PAYLD,
	START	9	culturas	PEYLD, TECHNO, VIYLD, RIYLD, PSYLD, MZYLD, SMYLD
TRANSP	PRNOTR	3, 2	zonas, períodos	ITPORT, MAIN
	IYRTPT			
	PRZONE	3	zonas	
TUBERS	TUBCAL			MAIN, PRALLO
	TUBTP			
UBCHNG	UBPHCH			CBUEFF, SOILCH, UNBUCH,
	UBALCH			VBUEFF, WBUEFF
	UBPCH			
	UBNCH			

COMMON	Variáveis	Dimensões	Índices	Subprogramas
USECOM	LUSE	10, 100	lotes, "patches"	ALLOC, BMYLD, CDISEA,
	IDUR	10, 100	lotes, "patches"	ICLEAR, LUALLO, MAIN,
	LASTUS	10, 100	lotes, "patches"	MAINT, MZYLD, PAYLD,
	CONTIN	10, 100		PEYLD, PSYLD, RIYLD,
				SMYLD, UNBUCH, USETOT,
				VIYLD, PASTSO, LABOR,
				LOTPRO
USEPR	PLU	4, 10	estratégias,	LUALLO, MAIN
			culturas	
	PCAGPE			
	PPEGCA			
UTCOM	LUMAXR	10, 100	lotes, "patches"	CBUEFF, EROSN, SOILCH,
	DAYSBA	10, 100	lotes, "patches"	UNBUCH, USETOT, SQOUT
	DAYSAC	10, 100	lotes, "patches"	
	DAYSTC	10, 100	lotes, "patches"	
	DAYSPA	10, 100	lotes, "patches"	
	DAYSFA	10, 100	lotes, "patches"	
	RAINBA	10, 100	lotes, "patches"	
	RAINAC	10, 100	lotes, "patches"	
VIRGCL	IVCLFI			ALLOC, ICLEAR, LUALLO
WAGELA	LABPAT	10	lotes	CASHAL, LEAVE, STRAT,
	PTYLAB	4, 4	tipos de mão-de-	WAGE
			obra, tipos de	
			colonos	
	TOLAME	4	tipos de mão-de-	
			obra	

COMMON	Variáveis	Dimensões	Índices	Subprogramas
WAGELA (continuação)	TOLASD	4	tipos de mão-de-obra	
	RMLAME	4	tipos de mão-de-obra	
	RMLASD	4	tipos de mão-de-obra	
	EARNME	4	tipos de mão-de-obra	
	EARNSD	4	tipos de mão-de-obra	
	PLEAVE	2, 4	estados civis, tipos de colonos	
WEACOM	RAIN	366	dias	MAXRA, WEABD, WEAGEN
	EVAP	366	dias	
	RINSOL	366	dias	
WEATOT	RAINSU			SGBQ, WEATOT, WEABD
	EVAPSU			
	RINSSU			
WEEDS	CONMAX			MAIN, ICLEAR
YIELDS	YLDRI			BMYLD, CAYLD, LOTPRO,
	YLDMZ			MZYLD, PAYLD, PEYLD,
	YLDPS			PSYLD, RIYLD, SMYLD,
	YLDVI			VIYLD
	YLDBM			
	YLDSM			
	YLDPE			
	YLDCA			

COMMON	Variáveis	Dimensões	Índices	Subprogramas
YLDCAL	ICRCAL	11	códigos de chamadas das culturas	MAIN, RIYLD, MZYLD, BMYLD, SMYLD, VIYLD, PSYLD

VARIÁVEIS ENDÓGENAS

Variável	Índices	COMMON	Tipo	Definição
AL	LOT, IPCH	SOIL	DOUBLE PRECISION	Alumínio (Al^{+++}) no solo do lote e do "patch" em ME/100g
ALBEFF		BEFORE	DOUBLE PRECISION	Alumínio (Al^{+++}) da roça no estado inicial do ano (ME/100g)
ALCH		BUCHNG	DOUBLE PRECISION	Alteração no alumínio (Al^{+++}) (ME/100g)
AMTLO	LOT, número do empréstimo	FIN	REAL	Quantia do empréstimo para este número de empréstimo (Cruzeiros de 1º/jan./1975)
ANPRPC		KMEAS	REAL	Proteína animal per capita: uma medida da capacidade de suporte computada (gramas/ pessoa/dia)
AREA	uso (ver códigos "USEPR")	AREAS	REAL	Área em hectares em ca um dos 10 usos
AREACL	LOT	COLON	REAL	Área desmatada em hectares para o lote (toda a terra não virg
BUQUAL	LOT, IPCH	BURNS	INTEGER	Qualidade de queima (1=ruim, 2=bom)

Variável	Índices	COMMON	Tipo	Definição
BUTYP	LOT, IPCH	BURNS	INTEGER	Tipo de queima (1=virgem 2=capoeira, 3=ervas daninhas)
CALOPC		KMEAS	REAL	Calorias per capita: medida de capacidade de suporte computada para o lote (Kcal/pessoa dia)
CAPCON	LOT	COLON	REAL	Capital para consumo (Cruzeiros de 1º de janeiro de 1975)
CAPENT	LOT	COLON	REAL	Capital para investiment em empresas (Cruzeiros de 1º de janeiro de 1975
CAPIT	LOT	COLON	REAL	Capital para investiment no lote (distinto tanto do capita da empresa quanto do de consumo) (Cruzeiros de 1º de janeiro de 1975)
CARB	LOT, IPCH	SOIL	DOUBLE PRECISION	Carbono no solo do lote e do "patch" (% de peso seco)
CBEFF		BEFORE	DOUBLE PRECISION	Carbono da roça no estad inicial do ano (% de peso seco)

Variável	Índices	COMMON	Tipo	Definição
CGOCON	LOT	COLON	REAL	Bens capitais (duráveis para consumo (valor em Cruzeiros de 1º de janeiro de 1975)
CGOENT	LOT	COLON	REAL	Bens capitais para empresas (Cruzeiros de 1º de janeiro de 1975)
CGOODS	LOT	COLON	REAL	Bens capitais para utilização no lote (produção agrícola) (valor em Cruzeiros de 1º de janeiro de 1975)
CLAY	LOT, IPCH	SOIL	DOUBLE PRECISION	Conteúdo de argila no solo do lote e do "patch" (% do peso de matéria particulada)
CONTIN	LOT, IPCH	USECOM	REAL	Dias sob cultivo contínuo até o último dia do ano agrícola anterior (Aqui cultivo inclui cultura perene, pasto e solo limpo)
DAYSAC	LOT, IPCH	UTCOM	REAL	Dias sob culturas anuais (durante o ano)
DAYSBA	LOT, IPCH	UTCOM	REAL	Dias de solo limpo (nu) (durante o ano)

Variável	Índices	COMMON	Tipo	Definição
DAYSFA	LOT, IPCH	UTCOM	REAL	Dias em pousio (ervas daninhas ou capoeira) (durante o ano)
DAYSTC	LOT, IPCH	UTCOM	REAL	Dias sob culturas de "arvores" (cacau ou pimenta) durante o ano
DAYSPA	LOT, IPCH	UTCOM	REAL	Dias sob pastagens (durante o ano)
DUEINT	número do empréstimo	FIN	REAL	Quantidade de juros devidos sobre este número de emprésimo (Cruzeiros de 1º de janeiro de 1975)
DUEPRI	número do empréstimo	FIN	REAL	Quantidade de capital da dívida devido para este número de empréstim (Cruzeros de 1º de janeiro de 1975)
EAT	produto (ver códigos de produto)	FOOD	REAL	Kg de produto consumido para o lote e o ano
EATGAM	LOT	FOOD	REAL	Caça consumida (kg/lote no ano)
EROS		EROCOM	REAL	Erosão em milímetros no "patch" e no ano

Variável	Índices	COMMON	Tipo	Definição
EVAP	dia do ano de calendário	WEACOM	REAL	Evaporação em milímetros
EVAPSU		WEATOT	REAL	soma de evaporação (soma de mm de evaporação entre as datas usadas no solicitação de WEABD)
EYNOM	cultura	EXPECT	REAL	Número de dados para produções esperadas (número de "patches" usados em totais para EYSUM e EYSSQ). Culturas 1=arroz, 2=milho, 3= Phaseolus, 4=Vigna, 5=mandioca brava, 6= macaxeira.
EYSSQ	cultura	EXPECT	REAL	A soma dos quadrados para produções esperadas Culturas são o mesmo como para EYNOM.
EYSUM	cultura	EXPECT	REAL	Soma de produções esperadas para a cultura (total de kg/ha em "patches"). Culturas sã os mesmos como para EYNO

Variável	Índices	COMMON	Tipo	Definição
FAMLAB	LOT	COLON	REAL	Força de mão-de-obra familiar total em equivalentes $homem_m$-dia de homens adultos para o ano.
FAMSIZ	LOT	COLON	REAL	Tamanho da família (número de pessoas de qualquer sexo ou faixa etária incluindo imigrantes individuais).
FINPC		FINPCH	REAL	Número de "patches" financiados (usado em LOANG no cálculo das prestações para financíamento dos custos de CAPIT).
FLMALE	mês de calendário	FLAB	REAL	Mão-de-obra masculina na família (apenas adultos) para este mês de calendário (homem-dias).
FLTOT	mês de calendário	FLAB	REAL	Mão-de-obra total na família (homem-dias equivalentes de adultos masculinos). Isto é para pessoas de todos os sexos e idades.

Variável	Índices	COMMON	Tipo	Definição
HABE		DEMAND	REAL	Hectares de feijão (ou Phaseolus ou Vigna) que o colono acha que serão necessários para suprir a subsistência de sua família.
HAMN		DEMAND	REAL	Hectares de mandioca (tanto brava como macaxeira) que o colono acha que serão necessários para suprir a subsistência de sua família.
HAMZ		DEMAND	REAL	Hectares de milho que o colono acha que serão necessários para suprir a subsistência de sua família.
HARI		DEMAND	REAL	Hectares de arroz que o colono acha que serão necessários para suprir a subsistência da sua família.
IBPEST		DISEA	INTEGER	Indicador de que a doença "podridão parda" está estabelecida na área (1=não, 2=sim).

Variável	Índices	COMMON	Tipo	Definição
IBPOD	LOT, IPCH	DISEA	INTEGER	Indicador de "podridão parda" para o "patch" (0=não, 1=sim).
ICRCAL	código de chamada de culturas (ver seção de códigos)	YLDCAL	INTEGER	Chamada da cultura: número de chamadas sobre as sub-rotinas de produção para uma dada cultura em um dado lote e ano. Usado para identificar as primeiras chamadas para um lote e ano para cálculo dos multiplicadores e densidades de plantio das culturas para o ano. Valores: 0=não chamado ainda para lote e ano e cultura, 1=chamado previamente para lote, ano e cultura.
IDUR	LOT, IPCH	USECOM	INTEGER	Duração da posição do código UTCOM para este "patch" até o último dia do ano agrícola anterior. Duração em dias. (Ver seção de códigos para códigos "UTCOM").

Variável	Índices	COMMON	Tipo	Definição
IFERT	LOT, IPCH	FERT	INTEGER	Indicador do adubo: indica que o "patch" foi adubado. (0=não adubado, 1=adubado).
IFEM	LOT, idade	POP	INTEGER	Número de fêmeas no lote para cada uma das 86 faixas etárias demográficas.
IFUEST		DISEA	INTEGER	Indicador de que Fusarium está estabelecido na área (1=não, 2=sim).
IFUSAR	LOT, IPCH	DISEA	INTEGER	Indicador de Fusarium para o "patch" (0=não, 1=sim).
IHUNT	LOT	GAME	INTEGER	Classificação do colono como caçador (1=caçador, 2=não caçador).
IORIG	LOT	COLON	INTEGER	Código do colono pioneiro (1=pioneiro (colono original), 2= chegado mais recentemente).
IPCH			INTEGER	Número do "patch"
ISCALL		SEEDNE	INTEGER	Indicador para as chamadas na sub-rotina SEEDS. (0=não chamada antes para o lote e ano, 1=chamada antes).

Variável	Índices	COMMON	Tipo	Definição
ISOLV	LOT	FIN	INTEGER	Código de solvência para o colono (para elegibilidade do empréstimo bancário). (1=solvente, 2=insolvente).
IVCLFI		VIRGCL	INTEGER	Indicador do financiamento virgem (usado pelo ICLEAR para comunicar ao LUALLO se o número do "patch" devolvido foi ou não financiado para derrubada da mata virgem). (0= não financiado, 1= financiado).
IWBEST		DISEA	INTEGER	Indicador de que a "vassoura de bruxa" está estabelecida na área (1=não, 2=sim).
IWBROO	LOT, IPCH	DISEA	INTEGER	Indicador da "vassoura de bruxa" para o lote e "patch" (0=não, 1= sim).
IYR		DATE	INTEGER	Ano (iniciando no 1 ao começo da simulação).

Variável	Índices	COMMON	Tipo	Definição
LABCAL		FLAB	INTEGER	Chamadas da mão-de-obra (chamadas na função LABOR) (1=primeira chamada para o lote e ano, 2=chamadas subsequentes).
LABPAT	LOT	WAGELA	INTEGER	Código do padrão de mão-de-obra (0=nenhuma, 1=salário por dia (diarista), 2=empresário, 3=empregado do governo ou outra profissão, 4= mulheres e crianças pagas, 5=1+4, 6=2+4, 7=3+4).
LASTUS	LOT, IPCH	USECOM	INTEGER	O código UTCOM para o "patch" até o último dia do ano agrícola anterior (ver seção de códigos).
LLOTSG		BQCALL	INTEGER	Último lote para capoeira: o último lote para o qual uma chamada foi feita em SGBQ.
LLOTV		BQCALL	INTEGER	Último lote virgem: indicador do último lote para qualidade de queima de mata virgem (número do último lote para o qual foi feita uma

Variável	Índices	COMMON	Tipo	Definição
LLOTV (continuação)				chamada no VBQ).
LLOTW		BQCALL	INTEGER	Último lote de ervas daninhas: o último lote para o qual foi feita uma chamada no WBQ (nota: WBQ, a sub-rotina de qualidade de queima de ervas daninhas não está incluída na presente versão do KPROG2).
LOANDA	LOT, número de empréstimo	FIN	INTEGER	Data de empréstimo (começando com 1 como primeiro ano da simulação) para este número de empréstimo (IYR para o ano de concessão do empréstimo).
LOANTY	LOT, número de empréstimo	FIN	INTEGER	Tipo de empréstimo para este número de empréstimo (1=terra e casa, 2= derrubada de mata virgem do primeiro tipo (período de 8 anos, inclusive "broca" e "coivara"), 3=derrubada de mata virgem

Variável	Índices	COMMON	Tipo	Definição
LOANTY				do segundo tipo (período de 1 ano, inclusive "broca e "coivara"), 4=débito do INCRA (salário), 5=outros débitos de itens duráveis (moto serra, etc.), 6=sementes do INCRA, 7=custeio de arroz (inclusive da roçada de capoeira), 8= custeio do milho, 9= custeio do Phaseolus, 10=culturas perenes (cacau e pimenta), 11= gado e pastagem, 12= particular).
(continuação)				
LOT			INTEGER	Número do lote
LOTUSE	Código de uso da terra (código LUOUT)	LUOUT	INTEGER	Indicador de se o lote tem o presente uso da terra: usada para computação das medidas USEOUT para proporção de lotes em USECNT. (0=não presente, 1= presente).

Variável	Índice	COMMON	Tipo	Definição
LUMAXR	LOT, IPCH	UTCOM	INTEGER	Uso da terra no auge da época da chuva: o código de uso da terra no dia em que o máximo de chuva caiu em 24 horas. 1=virgem, 2=cultura anual ou solo limpo, 3=pimenta, 4=cacau, 5=pastagem, 6=ervas daninhas, 7=capoeira.
LUPAT	LOT	COLON	INTEGER	Padrão de uso da terra. 1=culturas anuais para venda, 2=culturas perenes para venda, 3=pecuária, 4=mão-de-obra externa.
LUSE	LOT, IPCH	USECOM	INTEGER	Uso da terra do "patch". Ver códigos de usos da terra.
LTYSG		BQCALL	INTEGER	Último ano para capoeira: o último ano para o qual foi feita uma chamada em SGBQ.
LYRV		BQCALL	INTEGER	Último ano para virgem: o último ano para o qual foi feita uma chamada em VBQ.

Variável	Índices	COMMON	Tipo	Definição
LYRW		BQCALL	INTEGER	Último ano para ervas daninhas: o último ano para o qual foi feita uma chamada em WBQ. Note que WBQ (sub-rotina da qualidade de queimada de ervas daninhas) não aparece na versão corrente de KPROG2.
MALE	LOT, idade	POP	INTEGER	Número de machos no lote em cada uma das 86 classes etárias demográficas.
MALES	LOT	COLON	INTEGER	Mão-de-obra masculina no lote (homens adultos homem-dias/ano).
MARIT	LOT	POP	INTEGER	Estado civil do colono (dono do lote): 1=solteiro 2=casado).
MORTYP	LOT	COLON	INTEGER	Tipo de colono: 1= empresários, 2= agricultores auto-suficientes, 3=artesãos, 4=dependentes.
NITRO	LOT, IPCH	SOIL	DOUBLE PRECISION	Nitrogênio no solo do lote e do "patch" (% do peso seco).

Variável	Índices	COMMON	Tipo	Definição
PBEFF		BEFORE	DOUBLE PRECISION	Fósforo da roça no estado inicial do ano (ppm).
PCH		BUCHNG	DOUBLE PRECISION	Alteração no fósforo (ppm).
PH	LOT, IPCH	SOIL	DOUBLE PRECISION	pH do solo no lote e no "patch".
PHBEFF		BEFORE	DOUBLE PRECISION	pH da roça no estado inicial do ano.
PHCH		BUCHNG	DOUBLE PRECISION	Alteração no pH.
PHOS	LOT, IPCH	SOIL	DOUBLE PRECISION	Fósforo no solo do lote e do "patch" (ppm)..
PRES	código de produto	PROD	REAL	Kg do produto presente no lote. Ver seção de códigos para produtos.
PROTPC		KMEAS	REAL	Proteína per capita: medida da capacidade de suporte computada (gramas equivalentes à proteína de ovo de proteína total/pessoa/ dia).
RAIN	dia do ano de calendário	WEACOM	REAL	Precipitação pluviomêtic em mm neste dia do ano de calendário.

Variável	Índices	COMMON	Tipo	Definição
RAINAC	LOT, IPCH	UTCOM	REAL	Chuva em mm que caiu enquanto o "patch" estava sob culturas anuais durante o ano corrente.
RAINBA	LOT, IPCH	UTCOM	REAL	Chuva em mm que caiu enquanto o "patch" estava despojado (nu) durante o ano corrente.
RAINSU		WEATOT	REAL	Soma de chuva (soma de mm de chuva entre as datas usadas na chamada de WEABD).
RINSOL	dia do ano de calendário	WEACOM	REAL	Insolação em horas neste dia do ano de calendário.
RINSSU		WEATOT	REAL	Soma de insolação: soma das horas de insolação entre as datas usadas na chamada de WEABD.
RNBEFF		BEFORE	DOUBLE PRECISION	Nitrogênio da roça no estado inicial do ano (% do peso seco).
RNCH		BUCHNG	DOUBLE PRECISION	Alteração no nitrogênio (% do peso seco).

Variável	Índices	COMMON	Tipo	Definição
STDRD	item, IYR	STAND	REAL	Valores padrão computados para saída. Ver códigos STANDARDS para itens na seção de códigos.
SUBNCH		FOOD	REAL	Necessidade de dinheiro para subsistência: Cruzeiros de 1º de janeiro de 1975 necessários para satisfazer à subsistência para a família durante o ano, incluindo quantidades ao nível de subsistência de todos os produtos e necessidade de outras compras em dinheiro.
TECH	cultura	TECHN	REAL	Efeito da tecnologia (i.e. melhoramento genético). Proporção da produção como calculado apartir das produções de base obtidas nas estações experimentais no início da execução (incluindo efeito cumulativo de todos os melhoramentos tecnológicos).

Variável	Índices	COMMON	Tipo	Definição
TECH (continuação)				Códigos das culturas: 1=arroz, 2=milho, 3= Phaseolus, 4=Vigna, 5=mandioca brava, 6= macaxeira, 7=cacau, 8=pimenta, 9=pastagem.
UBALCH		UBCHNG	DOUBLE PRECISION	Alteração do alumínio não queimado (a alteraçã do Al^{+++} em ME/100g resultante de processos outros que a queima para o "patch" em questão).
UBNCH		UBCHNG	DOUBLE PRECISION	Alteração do nitrogênio não queimado (a alteração do nitrogênio resultante de processos outros que a queima do "patch" em questão). (% do peso seco).
UBPCH		UBCHNG	DOUBLE PRECISION	Alteração do fósforo não queimado (a alteração do fósforo restultante de processos outros que a queima para o "patch" em questão) (ppm).

Variável	Índices	COMMON	Tipo	Definição
USEOUT	item, código de uso da terra	LUOUT	REAL	Medidas das saídas de usos da terra. Em USECNT estas são totais: elas estão convertidas em proporções em MAIN antes de ser escritas como saída. Itens: 1= proporção da área em estudo com o uso da terra colhida, 2= proporção de lotes com o uso da terra colhida, 3=média da produção da cultura na área em toda a sua extensão em "patches" onde foi feita a colheita em kg/ha/ano crescido. Códigos de uso da terra: primeiros 12 códigos do uso da terra "LUOUT" (ver seção de códigos).
VIRGSO	LOT, IPCH	HISTOR		Indicador de solo virgem (para indicar o plantio prévio em Phaseolus para cálculo de probabilidade de ataque de Rhizoctonia.

Variável	Índices	COMMON	Tipo	Definição
VIRGSO (continuação)				1=virgem (não previamente plantado com Phaseolus), 2= previamente plantado com Phaseolus.
YLDBM		YIELDS	REAL	Produção da mandioca brava (kg de farinha/ ha/12 meses de crescimento) para o último "patch" examinado pelo BMYLD.
YLDCA		YIELDS	REAL	Produção do cacau (kg/ha/ano) para o último "patch" examinado pelo CAYLD.
YLDMZ		YIELDS	REAL	Produção do milho (kg/ha para o último "patch" examinado pelo MZYLD.
YLDPA		YIELDS	REAL	Produção da pastagem (kg do ganho de peso vivo do boi/ha/ano) para o último "patch" examinado pelo PAYLD.

Variável	Índices	COMMON	Tipo	Definição
YLDPE		YIELDS	REAL	Produção da pimenta (kg/ha/ano) para o último "patch" examinado pelo PEYLD.
YLDPS		YIELDS	REAL	Produção do Phaseolus (kg/ha) para o último "patch" examinado pelo PSYLD.
YLDRI		YIELDS	REAL	Produção do arroz (kg/ha) para o último "patch" examinado pelo RIYLD.
YLDSM		YIELDS	REAL	Produção da macaxeira (kg de farinha/ha/ 12 meses de crescimento) para o último "patch" examinado pelo SMYLD.
YLDVI		YIELDS	REAL	Produção de Vigna (kg/ha) para o último "patch" examinado pelo VIYLD.
YRBUPR	código do produto	PRIC	REAL	Preço de compra do ano para o produto (Cruzeiro de 1º de janeiro de 1975 Ver seção de códigos para códigos dos produtos.

Variável	Índices	Comum	Tipo	Definição
YRSEPR	código do produto	PRIC	REAL	Preço de venda do ano para o produto (Cruzeiros de 1º de janeiro de 1975/kg para o ano). ver seção de códigos para códigos dos produtos.

VARIÁVEIS EXÓGENAS NOS DADOS DE ENTRADA

Variável	Índices	COMMON	Tipo	Definição
AGBRME		POP	REAL	Média de idade da noiva: idade em anos da noiva de um colono solteiro (proprietário do lote) que casa.
AGBRSD		POP	REAL	Desvio padrão da idade da noiva: para idade em anos da noiva de um colono solteiro (proprietário do lote) que casa.
ALLIME		FERT	REAL	Dose de calcário (kg/ha de calcário dolomítico) a ser aplicada por unidade (ME/100g) de alumínio (Al^{+++}) no solo.
AMTPHA	tipo de empréstimo	LOANS	REAL	quantia financiada por hectare em Cruzeiros de 1º de janeiro de 1975. Exceção: para os tipos de empréstimo 1, 5, 11 e 12 esta é a quantia do empréstimo. Ver seção de códigos para os tipos de empréstimos.

Variável	Índices	COMMON	Tipo	Definição
ANIPRO	Código do produto	NUTRI	REAL	Conteúdo de proteína animal dos 17 itens (produtos) em kg proteín animal/kg do produto. Ver seção de códigos para os códigos de produtos.
ANPMIN		STAND	REAL	Padrão mínimo de proteín animal: gramas de proteína animal por pessoa por dia, padrão mínimo para comparações de capacidade de suporte
BASEPY		PASTUR	REAL	Produção básica da pastagem (produção em kg de peso seco de gramíneas/ha/ano da variedade usada (aqui Panicum maximum) a 2,0 ppm de fósforo no solo para o primeiro ano como pastagem).
BPMULT		DISEA	REAL	Multiplicador da doença podridão parda: a proporção da produção do cacau esperada sem a doença caso seja atacado pela podridão parda.

Variável	Índices	COMMON	Tipo	Definição
BTRCME		PRALCO	REAL	Custo médio de viagens ao banco para venda das culturas (Cruzeiros de 1º de janeiro de 1975).
BTRCSD		PRALCO	REAL	Desvio padrão do custo das viagens ao banco para venda das culturas (Cruzeiros de 1º de janeiro de 1975/colheita).
BURNPR	tipo de queima	BUPROB	REAL	Probabilidade de que um "patch" será queimado dado que está "desmatado" e alocado, segundo o tipo de queima. Tipos de queima: 1=virgem, 2=capoeira, 3=ervas daninhas.
BUYME	código do produto	COSTS	REAL	Preço médio da compra dos produtos (Cruzeiros de 1º de janeiro de 1975/ kg). Ver seção de códigos para códigos dos produtos.
BUYSD	código do produto	COSTS	REAL	Desvio padrão do preço de compra dos produtos (Cruzeiros de 1º de janeiro de 1975/kg) (entre lotes dentro de um ano).

Variável	Índices	COMMON	Tipo	Definição
CALAGE	classe etária para o fator calórico	POP	REAL	Fator calórico: um fator que expressa o efeito da falta de calorias sobre o excesso de mortalidade nas populações por classes etárias. Classes etárias para o fator calórico: 1=0 anos (IAGE=1), 2= 1 a 3 anos (IAGE=2 a 4), 3=4 a 6 anos (IAGE=5 a 7), 4=7 a 9 anos (IAGE= 8 a 10), 5=10 a 12 anos (IAGE=11 a 13), 6=13 a 15 anos (IAGE=14 a 16), 7=16 a 19 anos (IAGE= 17 a 20), 8=20 ou mais anos (IAGE=21 a 86).
CALMIN		STAND	REAL	Padrão mínimo de calorias: média mínima Kcal/pessoa/ dia para comparações da capacidade de suporte.

Variável	Índices	COMMON	Tipo	Definição
CALOR	código do produto	NUTRI	REAL	Conteúdo calórico dos produtos (Kcal/kg). Para carnes isto é calculado usando-se peso das carnes tratadas. Ver seção de códigos para códigos dos produtos.
CALREQ	classe etárias para exigências calóricas	POP	REAL	Exigências calóricas (Kcal/pessoa/dia) segundo a classe etária para exigências calóricas. Classes etárias para exigências calóricas: anos 0 até 19 (IAGE= 1 até 20) são 1 até 20. Anos 20 a 39 (IAGE=21 a 40)= 21, anos 40 a 49 (IAGE=41 a 50)=22, anos 50 a 59 (IAGE=51 a 60)= 23, anos 60 a 69 (IAGE= 61 a 70)=24, anos 70 ou mais (IAGE=71 a 86)=25.

Variável	Índices	COMMON	Tipo	Definição
CAPME	tipo de colono, classificação do colono em termos de originalidade (pioneiro ou não)		REAL	Capital inicial médio CAPIT(LOT)) para colonos deste tipo e classificaçã Para os colonos que chegaram mais recentement este valor é considerado após o pagamento de todos os débitos para seu estabelecimento. Tipos de colonos: ver MORTYP, classificações de colonos em termos de originaldi dade: ver IORIG.
CAPSD	tipo de colono, classificação do colono em termos de originalidade (pioneiro ou não)		REAL	Desvio padrão do capital inicial (ver CAPME).
CGCME	tipo de colono, classificação do colono em termos de originaldidade (pioneiro ou não)		REAL	Bens de importância capital iniciais para consumo média para colonos deste tipo e classific ação. Tipos de colonos: ver MORTYP, códigos das classificações dos

Variável	Índice	Common	Tipo	Definição
CGCME (continuação)				colonos em termos de originalidade: 1= pioneiro, 2=chegado mais recentemente (Cruzeiros de 1º de janeiro de 1975).
CGCSD	tipo de colono, classificação do colono em termos de originalidade (pioneiro ou não)		REAL	Desvio padrão dos bens de importância capital para consumo. (ver CGCME). (Cruzeiros de 1º de janeiro de 1975).
CGEME	tipo de colono, classificação do colono em termos de originalidade (pioneiro ou não		REAL	Bens de importância capital iniciais para emprendimentos média para colonos deste tipo e classificação (Cruzeiros de 1º de janeiro de 1975). Tipos de colonos: ver MORTYP, códigos das classificações dos colonos em termos de originalidade: 1=pioneiro, 2=chegado mais recentemente.

Variável	Índice	COMMON	Tipo	Definição
CGESD	tipo de colono, classificação do colono em termos de originalidade (pioneiro ou não)		REAL	Desvio padrão dos bens de importância capital para emprendimentos (Cruzeiros de 1º de janeiro de 1975). Ver CGEME.
CGLME	tipo de colono, classificação do colono em termos de originalidade (pioneiro ou não)		REAL	Bens de importância capital iniciais para o lote (CGOODS(LOT)) média para colonos deste tipo e classificação. (Cruzeiros de 1º de janeiro de 1975). Tipos de colonos: ver MORTYP. Códigos das classificações dos colonos em termos de originalidade: 1=pioneiro, 2=chegado mais recentemente.

Variável	Índice	COMMON	Tipo	Definição
CGLSD	tipo de colono, classificação do colono em termos de originalidade (pioneiro ou não)		REAL	Desvio padrão dos bens de importância capital iniciais para colonos deste tipo e classificação. (ver CGLME). (Cruzeiros de 1º de janeiro de 1975).
CHICMZ		PRALCO	REAL	Quantidade de peso ganho pelas galinhas calculada do fator de conversão do milho: peso em kg das galinhas vivas conseguidas/kg de milho utilizado na alimentação.
CHPCFI		STAND	REAL	Padrão mínimo da renda em dinheiro per capita: (mínimo de cruzeiros de 1º de janeiro de 1975 por pessoa por mês para comparações da capacidade de suporte).
CHPFMI		STAND	REAL	Padrão mínimo da renda em dinheiro por família (mínimo de cruzeiros de 1º de janeiro de 1975 por família por mês para comparações de capacidade

CLLMAX		STAND	REAL	Padrão máximo de desmatamento do lote (proporção). O máximo desmatável para comparações com padrões da capacidade de suporte.
CLPROB	classe de desmatamento		REAL	Probabilidade do desmatamento por classes de desmatamento. Probabilidades são probabilidades de algum desmatamento deste tipo dada a existência da terra virgem e terra deste tipo. "Desmatamento" é preparção da terra para outras culturas além da pastagem. Códigos das classes de desmatamento: 1= ervas daninhas (≤ 8 meses de idade), 2=capoeira com menos de 2 anos de idade, 3=capoeira com 2-3 anos de idade, 4=capoeira com 4-6 anos de idade, 5= capoeira com 7-11 anos

Variável	Índices	COMMON	Tipo	Definição
CONPHO		FERT	REAL	Termo constante da regressão do fósforo (nível do fósforo no solo apartir dos kg/ha P_2O_5 aplicado).
CONSLI		FERT	REAL	Termo constante da regressão do calcário para alteração de pH.
CRECME		OUTSID	REAL	Dinheiro médio recebido (média de cruzeiros de 1º de janeiro de 1975 recebido por um colono dado que ele recebe algo por fora da área).
CRECSD		OUTSID	REAL	Desvio padrão do dinheiro recebido (dinhero em cruzeiros de 1º de janeiro de 1975 por ano para aqueles colonos que recebem alguma renda de fora da área).
CSENME		OUTSID	REAL	Dinheiro médio enviado (cruzeiros de 1º de janeiro de 1975 por ano daqueles colonos que enviam dinheiro para fora da área em um dado ano).

Variável	Índices	COMMON	Tipo	Definição
CSENSD		OUTSID	REAL	Desvio padrão do dinheiro enviado (cruzeiros de 1º de janeiro de 1975 daqueles colonos que enviam dinheiro para fora em um dado ano).
CWASTE		PRALLO	REAL	Fator de desperdiço de galinhas (kg peso de carne tratada/kg de peso vivo).
DALOME	doença	SICK	REAL	Média de dias perdidos: número médio de dias de trabalho perdidos por doença. Dias são atuais, não homem-dia equivalentes. Códigos de doença: 1=malária, 2= acidente, 3=outra.
DALOSD	doença	SICK	REAL	Desvio padrão de dias perdidos por doença. (Ver DALOME).
DEPREC			REAL	Taxa de depreciação para bens de importância capital (proporção de desvalorização por ano).

Variável	Índices	COMMON	Tipo	Definição
DOSECA	elemento, nível do nutriente, classe anual	FERT	REAL	Doses de adubo (Kg de ingredientes ativos/ha) para o cacau. Elementos: 1=fósforo, 2=potássio, 3=nitrogênio, 4=estrume. Níveis de nutrientes do solo: 1=baixo, 2=alto. Classes anuais: 1=1 ano, 2=2 anos, 3=3 anos ou mais.
DOSEPE	elemento, nível do nutriente, classe anual	FERT	REAL	Doses de adubo (Kg de ingredientes ativos/ha) para pimenta. Elementos: 1=fósforo, 2=potássio, 3=nitrogênio, 4=estrume. Níveis de nutrientes do solo: 1=baixo, 2=alto, Classes anuais: 1=1 ano, 2=2 anos, 3=3 anos, 4= 4 anos ou mais.
EARNME	tipo de mão-de-obra	WAGELA	REAL	Lucro médio recuperado sobre investimentos em empresas (Cruzeiros de 1º de janeiro de 1975 por ano por cruzeiro de 1º de janeiro de 1975 investido) para mão-de-

Variável	Índices	COMMON	Tipo	Definição
EARNME (continuação)				obra tipo 2 (empresário). Para a mão-de-obra tipo 1 isto é o salário pago em cruzeiros de 1º de janeiro de 1975 por homem adulto-dia. Para outros tipos de mão-de-obra isto é o lucro anual médio (cruzeiros de 1º de janeiro de 1975/ano). Tipos de mão-de-obra: 1=salário por dia (diarista), 2=empresário, 3= empregado do governo ou profissional, 4=crianças e mulheres que recebem.
EARNSD	tipo de mão-de-obra	WAGELA	REAL	Desvio padrão do lucro recuperado sobre investimento para mão-de-obra tipo 2 (recuperação proporcional para ambos capital e bens de importância capitais junto). Para mão-de-obra tipo 1 é o salário por dia, para outras é o lucro anual. Ver EARNME.

Variável	Índices	Comum	Tipo	Definição
EFFINT		GAME	REAL	"Intercept" da queda do esforço da caça (homem-dias/caçador/ano).
EFFORT	mês de calendário	GAME	REAL	Proporção do esforço de caça total dispendido anualmente em cada mês de calendário.
EFFSLO		GAME	REAL	Declividade da queda do esforço de caça (homem-dias/caçador/ano).
ELLIM	elemento	FERT	DOUBLE PRECISION	Limite do elemento: valor máximo para o nível do elemento no solo acima do qual a adubação não pode elevar o nível do elemento no solo. Códigos dos elementos: 1=fósforo, 2=pH.
ESPOIL	produto	SPOIL	REAL	Proporção de perda esperada: a proporção do produto que o colono espera que será danificado após a colheita. Códigos dos produtos: 1=arroz, 2=milho,

Variável	Índices	COMMON	Tipo	Definição
ESPOIL (continuação)				3=Phaseolus, 4=Vigna, 5=mandioca brava, 6= macaxeira, 7=cacau, 8=pimenta, 9=calorias, 10=proteína total.
EYME	código da cultura		REAL	Produção média esperada (Kg/ha/ano) produção média que os colonos esperam obter. Códigos das culturas: 1=arroz, 2=milho, 3=Phaseolus, 4=Vigna, 5=mandioca brava, 6=macaxeira.
EYSD	código da cultura		REAL	Desvio padrão da produção esperada (Kg/hectare/ano). Ver EYME.
FAMSTR	item, classificação do colono em termos de originalidade (pioneiros ou não)	POP	REAL	Parâmetros da estrutura familiar. Itens: 1= idade média dos proprietários na chegada (anos), 2=desvio padrão da idade na chegada (anos), 3= probabilidade de outros dependentes (além da esposa) para colonos casados, 4=probabilidade

Variável	Índices	COMMON	Tipo	Definição
FAMSTR (continuação)				de outros dependentes para colonos solteiros, 5=probabilidade de ter esposa na chegada (incluindo amasiados), 6=idade média da esposa na chegada (anos), 7= desvio padrão da idade da esposa na chegada (anos), 8=probabilidade do outro dependente ser homem, 9=número médio de outros dependentes na chegada, 10=desvio padrão do número de outros dependentes na chegada, Códigos das classificações dos colonos em termos de originalidade: 1=pioneiro, 2=chegado mais recentemente.
FICOME		FICOST	REAL	Custo médio do financiamento (Cruzeiros de 1º de janeiro de 1975): custo médio para um colono das viagens ao banco e de outras despesas para obter financiamento.

Variável	Índices	COMMON	Tipo	Definição
FICOSD		FICOST	REAL	Desvio padrão do custo do financiamento (Cruzeiros de 1º de janeiro de 1975). Ver FICOME.
FINLME		FICOST	REAL	Perda da mão-de-obra em financiamentos (dias): média dos dias de mão-de-obra perdidos para arranjar o financiamento.
FINLSD		FICOST	REAL	Desvio padrão da perda da mão-de-obra em financiamentos (dias). Ver FINLME.
FLEQUI	sexo, classe etária da mão-de-obra	POP	REAL	Equivalente da mão-de-obra da família (equivalentes homem-dias) segundo o sexo e classe etária da mão-de-obra (Proporção do valor do homem adulto da mão-de-obra no trabalho agrícola). Sexos: 1=masculino, 2=feminino. Faixas etárias da mão-de-obra: 1=0-6 anos, 2=7-8 anos, 3=9-13 anos, 4=14-17 anos 5=18 ou mais anos.

Variável	Índices	COMMON	Tipo	Definição
FUMULT		DISEA	REAL	Multiplicador da doença Fusarium: a proporção da produção esperada sem a doença caso a pimenta esteja atacada por Fusarium.
GWASTE		GAME	REAL	Proporção do peso da caça viva desperdido.
HAFIME	tipos de empréstimo	LOANS	REAL	Média dos hectares financiados: o número médio de hectares que são financiados pelo banco por este tipo de empréstimo. Para os tipos de empréstimos 1, 4, 5, 11 e 12 isto é fixo no 1. Ver seção de códigos para tipos de empréstimos.
HAFISD	tipos de empréstimos	LOANS	REAL	Desvio padrão dos hectares financiados. Para os tipos de empréstimos 1, 4, 5, 11 e 12 isto está fixo no 0. Ver HAFIME.

Variável	Índices	COMMON	Tipo	Definição
IBEGYR	tipos de empréstimos	LOANS	INTEGER	Ano em que começa a disponibilidade deste tipo de empréstimo (anos do início da simulação).
IENDHU		GAME	INTEGER	Ano terminal para a caça (anos do início da simulação): o ano no qual populações de caça são reduzidas ao ponto em que as produções das caças são insignificantes.
IENDYR	tipos de empréstimos	LOANS	INTEGER	Anos em que termina a disponibilidade deste tipo de empréstimo (anos do início da simulação).
IGRACE	tipos de empréstimo	LOANS	INTEGER	Período de carência em anos para empréstimos. Ver seção de códigos para tipos de empréstimos.

Variável	Índices	COMMON	Tipo	Definição
IMPEND	código da cultura		INTEGER	Ano em que termina os melhoramentos para a cultura (anos do início da simulação): ano após o qual nenhum melh oramento tecnológico pode aumentar a produção. Códigos das culturas: 1=arroz, 2=milho, 3= Phaseolus, 4=Vigna, 5=mandioca brava, 6= macaxeira, 7=cacau, 8= pimenta, 9=pastagem com gado.
INIT		RANDOM	INTEGER	Número inicial para gerador do número ao acaso. Pode ser 0 para a geração de número ao acaso automaticamente de acordo com a hora do dia (em M.T.S.), ou um grande número impar para um número repetível ao pseudo-acaso.

Variável	Índices	COMMON	Tipo	Definição
IPERIO	tipos de empréstimos	LOANS	INTEGER	Períodos de empréstimos em anos. Ver seção de códigos para tipos de empréstimos.
ISTOCH		DETERM	INTEGER	Indicador do tipo da execução. 1=determinístico, 2=estocástico.
IYRTPT		TRANSP	INTEGER	Ano em que começa o período de tempo dois para probabilidade de disponibilidade de transporte (anos do início da simulação).
LEARNS			INTEGER	Códigos de aprendizado de subsistência para colonos que aprendem a ajustar as alocações da terra à historia de produções passadas. 1=aprendendo, 2=não aprendendo.
LSPORE	doença	DISEA	INTEGER	Vida dos esporos no solo ou hospedeiros alternados para as doenças das culturas (anos). Códigos das doenças: 1=Fusarium, 2=vassoura de bruxa, 3= podridão parda.

Variável	Índices	COMMON	Tipo	Definição
LOTS		SIZES	INTEGER	Número de lotes na simulação.
MAXNLO		FIN	INTEGER	Número máximo de empréstimos de diferentes tipos permitidos por cada colono.
MONCOR	tipos de empréstimos	LOANS	INTEGER	Código de correção monetária: se os termos do tipo de empréstimo incluem correção da inflação ou não. 1=não, 2=sim. Ver seção de códigos para tipos de empréstimos.
NOPCHS		SIZES	INTEGER	Número de "patches" por lote na simulação.
PACHIP		PASTUR	REAL	Constante de pastagem aos níveis de fósforo altos: termo constante para a fase "plateau" (acima de 10 ppm de fósforo) de peso seco de pasto produzido da relação da produção do pasto com fósforo do solo. Ver Fearnside, 1978, capítulo 4).

Variável	Índices	COMMON	Tipo	Definição
PACOEF		PASTUR	REAL	Coeficiente do pasto: coeficiente de regressão da produção do peso seco do pasto sobre fósforo do solo (Ver Fearnside, 1978, capítulo 4).
PACONS		PASTUR	REAL	Constante do pasto: termo constante da regressão da produção de peso seco do pasto sobre o fósforo do solo (para níveis de fósforo abaixo de 10' ppm). Ver Fearnside, 1978, capítulo 4.
PBIRTH	idade	POP	REAL	Probabilidade por ano que uma mulher tehna filhos (idade-específica para idades de 1-44 anos).
PCAGPE		USEPR	REAL	Probabilidade de cacau dada a pimenta: a probabilidade de um colono que se especializ ou na pimenta como cultura perene de plantar cacau.

PCINT1	tipos de empréstimos	LOANS	REAL	Percentagem de juros ao primeiro nível (sem a penalidade de pagamento atrasado). Ver seção de códigos para tipos de empréstimos.
PCINT2	tipos de empréstimos	LOANS	REAL	Percentagem de juros ao segundo nível (com penalidade de pagamento atrasado). Ver seção de códigos para tipos de empréstimos.
PCRECD		OUTSID	REAL	Probabilidade de dinheiro recebido de fora (probabilidade por colono-ano que qualquer dinheiro foi recebido).
PCSENT		OUTSID	REAL	Probabilidade de haver dinheiro sendo enviado para fora (probabilidade por colono-ano).
PDEATH	sexo, idade	POP	REAL	Probabilidade de mortalidade por ano sob nutrição adequada (específica ao sexo e idade). Sexos: 1=masculino, 2=feminino. Idade=

Variável	Índice	COMMON	Tipo	Definição
PDEATH (continuação)				86 classes etárias demográficas (IAGE) começando de 1 para 0-12 meses.
PDEP	idade, classificação do colono em termos de originalidade (pioneiro ou não)	POP	REAL	Probabilidade de um dependente (outro que não a esposa do proprietário do lote) se encaixar em cada uma das 86 classes etárias demográficas, dado que o colono tem um dependente. Idade=IAGE (ver PDEATH). Classificações dos colonos em termos de originalidade: 1=pioneiro, 2=chegado mais recentemente.
PDISEA	doença, sexo, classe etária para doenças	SICK	REAL	Probabilidade por ano de que um indivíduo de dado sexo e classe etária para doenças contraria uma doença. Doenças: 1=malária, 2=acidente, 3=outra. Sexos: 1=masculino, 2=feminino. Classes

Variável	Índices	COMMON	Tipo	Definição
PDISEA (continuação)				etárias para doenças: 1=0-4 anos, 2=5-9 anos, 3=10-14 anos, 4=15-19 anos, 5=20-24 anos, 6=25-29 anos, 7=30-34 anos, 8=35-39 anos, 9=40-44 anos, 10=45-49 anos, 11=50-54 anos, 12=55-59 anos, 13=60 anos ou mais.
PDISMO	doença, mês de calendário	SICK	REAL	Probabilidade de doença por mês: probabilidade de que, dado que uma pessoa fique doente por algum período de tempo durante o ano, isto ocorrerá num determinado mês de calendário. Doenças: 1=malária, 2=acidente, 3=outra.
PFERT	código de culturas perenes	FERT	REAL	Probabilidade de adubação para uma dada cultura perene e ano para um lote. Decisão feita apenas uma vez para um dado lote, cultura e

PDISEA (continuação)				etárias para doenças: 1=0-4 anos, 2=5-9 anos, 3=10-14 anos, 4=15-19 anos, 5=20-24 anos, 6=25-29 anos, 7=30-34 anos, 8=35-39 anos, 9=40-44 anos, 10=45-49 anos, 11=50-54 anos, 12=55-59 anos, 13=60 anos ou mais.
PDISMO	doença, mês de calendário	SICK	REAL	Probabilidade de doença por mês: probabilidade de que, dado que uma pessoa fique doente por algum período de tempo durante o ano, isto ocorrerá num determinado mês de calendário. Doenças: 1=malária, 2=acidente, 3=outra.
PFERT	código de culturas perenes	FERT	REAL	Probabilidade de adubação para uma dada cultura perene e ano para um lote. Decisão feita apenas uma vez para um dado lote, cultura e ano: o colono ou aduba

PFERT (continuação)			toda a sua área em uma dada cultura perene ou não aduba em nenhum, em um dado ano. Códigos de culturas perenes: 1=cacau, 2=pimenta.
PHUNT	GAME	REAL	Probabilidade de um colono ser caçador.
PILOME	CASHPR	REAL	Proporção do capital de investimento (distinto dos bens de importância capital) empregado para o desenvolvimento do lote (distinto do para empresas) dado que o colono tem o padrão de mão-de-obra (distinto do tipo do colono) tipo 2 (empresário) ou 3 (profissão) ou 6 ou 7 (proporção média).
PILOSD	CASHPR	REAL	Desvio padrão da proporção do capital de investimento utilizado para o lote (Ver PILOME).

Variável	Índices	COMMON	Tipo	Definição
PINDIM		POP	REAL	Probabilidade de imigração individual: probabilidade por ano de um lote receber um imigrante individual.
PINFEC	doença, categoria de estabelecimento da doença	DISEA	REAL	Probabilidade de infecção em um dado "patch" e ano por doenças das culturas. Doenças: 1= Fusarium, 2=vassoura de bruxa, 3=podridão parda. Códigos de categoria de estabelecimento: 1=não estabelecido na área, 2=estabelecido na área.
PLEAVE	estado civil, tipo de colono	WAGELA	REAL	Probabilidade por ano da imigração da família. Código de estado civil: 1=solteiro, 2=casado. Tipos de colonos: 1= empresário, 2=agricultores auto-suficientes, 3=artesão, 4=dependente.

Variável	Índices	COMMON	Tipo	Definição
PLU	código de estratégia, código de cultura única	USEPR	REAL	Probabilidade de uso da terra em culturas de rendimento ("patchwise" examinado). PLU=hectare-anos da cultura para venda (rendimento) para cultura X e estratégia Y / total de hectare-anos para cultura para venda estratégia Y. Códigos de estratégia: 1=culturas anuais para venda, 2= culturas perenes, 3= pecuária, 4=mão-de-obra externa. Códigos de culturas únicas: 1=arroz, 2=milho, 3=Phaseolus, 4=Vigna, 5=mandioca brava, 6=macaxeira, 7= cacau, 8=pimenta, 9= pastagem sem animais, 10=pastagem com animais.
PMARRY		POP	REAL	Probabilidade por ano de um colono solteiro casar (proprietário de lote).

Variável	Índices	COMMON	Tipo	Definição
PMIMIG		POP	REAL	Probabilidade de que o imigrante individual recebido pelo lote seja do sexo masculino.
PPEGCA		USEPR	REAL	Probabilidade da pimenta dada a especialização do cacau: probabilidade de que um colono, que se especializou em cacau como cultura perene, plante pimenta.
PPLPAY		PRALCO	REAL	Probabilidade de pagamentc de empréstimo privado desde que a necessidade de subsistência seja satisfeita. (Probabilidade por ano).
PRBM		INTERP	REAL	Probabilidade da mandioca brava (só ou com outras culturas que não arroz ou milho): probabilidade por "patch", dada que a mandioca brava está plantada, de que ela está plantada nesta combinaçãc Nota: PRBM, PRBMMZ e

Variável	Índices	COMMON	Tipo	Definição
PRBM (continuação)				PRBMRI somados, não dão 1 dado que o resto representa a probabilidade da mandioca brava ser consorciada tanto com arroz como com milho.
PRBMMZ		INTERP	REAL	Probabilidade da mandioca brava consorciada com milho. Nota: a probabilidade da mandioca brava consorciada tanto com arroz como com milho não está incluída.
PRBMRI		INTERP	REAL	Probabilidade da mandioca brava consorciada com arroz. (Ver PRBM).
PRCG	categoria do dinheiro, tipo de colono	CASHPR	REAL	Proporção de bens de importância capital: proporção de que o capital de investimento que foi designado para a categoria, esteja sendo utilizado para a compra de bens de importância capital. Categorias do dinheiro: 1=lote,

Variável	Índices	COMMON	Tipo	Definição
PRCG (continuação)				2=empresa, 3=consumo. Tipos de colonos: 1= empresário, 2=agricultor auto-suficiente, 3= artesão, 4=dependente.
PRDIES	doença	DISEA	REAL	Probabilidade de que a cultura morra, dado que foi atacada pela doença (probabilidade por ano). Doenças: 1=Fusarium, 2= vassoura de bruxa, 3= podridão parda.
PRFIN	tipos de empréstimos	FPROBS	REAL	Probabilidade do finan mento ser pedido e retirado do banco dado que o colono decidiu usar a cultura em questão como uma cultura de rendimento e que o colono é solvente. Ver seção de códigos para tipos de empréstimos.

Variável	Índices	COMMON	Tipo	Definição
PRFINL	mês de calendário	FICOST	REAL	Proporção da perda de mão-de-obra em financiamento para o ano que cai em cada mês do calendário. Perda de mão-de-obra em financiamento são os dias que o colono perde em viagens à escritorios do governo e ao banco para arranjar o financiamento.
PRI		INTERP	REAL	Probabilidade do arroz sozinho: probabilidade de que, dado que o arroz está plantado, ele ficará sozinho ou com outras culturas que não o milho e/ou a mandioca.
PRIBM		INTERP	REAL	Probabilidade do arroz consorciado com mandioca brava.
PRICFE	adubo	FERT	REAL	Preço do adubo (Cruzeiros de 1º de janeiro de 1975/kg de ingrediente ativo). Adubos: 1=calcário, 2=P_2O_5, 3=K, 4=N, 5=esterco

Variável	Índices	COMMON	Tipo	Definição
PINDEM	sexo, idade	POP	REAL	Probabilidade por ano de um dado indivíduo emigrar, segundo o sexo e classe etária. Sexos: 1=masculino, 2=feminino. Classes etárias são os 86 faixas etárias demográficas (começãndo com 1 para individuos com menos de 1 ano de idade).
PRIMAG	sexo, idade	POP	REAL	Probabilidade de que um imigrante indivídual que chegou para um determinado lote pertença a cada classe etária de acordo com seu sexo. Sexos: 1= masculino, 2=feminino. Classes etárias são as 86 faixas etárias demográficas.
PRIMZ		INTERP	REAL	Probabilidade do arroz consorciado com milho (apenas).
PRIMZB		INTERP	REAL	Probabilidade do arroz consorciado com milho e mandioca brava.

Variável	Índices	COMMON	Tipo	Definição
PRIMZS		INTERP	REAL	Probabilidade do arroz consorciado com milho e macaxeira.
PRINME	tipo de colono		REAL	Proporção investido médio: a proporção de capital livre investido após satisfação das necessidades de subsistência, segundo o tipo de colono. "Capital livre" é definido como o dinheiro após pagamento dos débitos, "necessidades de subsistência" são definidas como o dinheiro gasto na subsistência das culturas + dinheiro gasto na carne enlatada e na carne de caça. Outras necessidades de dinheiro (incluídas em SUCASH) não estão incluídas; estas são satisfeitas do dinheiro de consumo após a alocação para o investimento.

Variável	Índices	COMMON	Tipo	Definição
PRINSD	tipo de colono		REAL	Desvio padrão do proporção investido: proporção do capital investido após satisfação das necessidades de subsistência segundo o tipo de colono. Ver PRINME.
PRIPA		INTERP	REAL	Probabilidade do arroz consorciado com pasto (ou arroz + pasto ou arroz + pasto + outras culturas).
PRISM		INTERP	REAL	Probabilidade do arroz consorciado com macaxeira.
PRNOTR	Zona, perôdo de tempo	TRANSP	REAL	Probabilidade de não haver transporte disponível para ir ao mercado na época da colheita. Zonas: 1=beira da estrada, 2=travessões antes da agrovila interior (10 km da estrada), 3= travessões após agrovila interior (10-20 km da estrada). Períodos de tempo: 1=primeiros 3 anos 2=anos subsequentes.

Variável	Índices	COMMON	Tipo	Definição
PROAGE	classe etária para o fator proteico	POP	REAL	Fator proteico: valor que expressa o efeito da deficiência proteica no excesso de mortalidade nas populações para 19 faixas etárias. Classes etárias para o fator proteico: o mesmo que "IAGE" (classe etária demográfica) até a classe etária 18, a classe etária 19 reúne todas as idades mais avançadas.
PROB	classe de pH após mudança, classe de pH antes da mudança, categoria de distância mudada	MATRIX	REAL	Probabilidades de transição para valores iniciais de pH do solo. Classes de pH: 1= abaixo de 4,0, 2=4,0-4,4; 3=4,5-4,9; 4= 5,0-5,4; 5=5,5-5,9; 6=6,0-6,4; 7=6,5 e acima. Categorias das distâncias mudadas: 1= 100m, 2=500m.

Variável	Índices	COMMON	Tipo	Definição
PROMIN		STAND	REAL	Padrão mínimo de proteína: proteína total em equivalentes a gramas de proteína do ovo para uso como padrão da capacidade de suporte. (per capita por dia).
PROPTY	tipo de colono, classificação do colono em termos de originalidade (pioneiro ou não)		REAL	Proporção dos tipos de colonos entre populações de colonos pioneiras e vindas mais tarde. Tipos de colonos: 1=empresário, 2=agricultores auto-suficientes, 3=artesãos, 4=dependentes, Classificação dos colonos em termos de originalidade: 1=pioneiros, 2=chegados mais recentemente.
PROREQ	classe etária para necessidade proteica	POP	REAL	Exigência proteica: (exigência proteíca total em equivalente gramas da proteína do ovo/pessoa/dia) segundo classe etária para necessidade proteica. Classes etárias para necessidade proteica:

Variável	Índices	COMMON	Tipo	Definição
PROREQ (continuação)				1=0 anos (IAGE=1), 2= 1-3 anos (IAGE=2-4), 3= 4-6 anos (IAGE=5-7), 4= 7-9 anos (IAGE=8-10), 5= 10-12 anos (IAGE=11-13), 6=13-15 anos (IAGE=14-16) 7=16-19 anos (IAGE=17-20) 8=20 ou mais anos (IAGE= 21-86).
PRPS		INTERP	REAL	Probabilidade de Phaseolu (probabilidade de plantad só comparado com plantado com milho verde; milho seco não é considerado).
PRSM		INTERP	REAL	Probabilidade da macax eira plantada só ou com outra cultura que não milho e/ou arroz. Nota: PRSM, PRSMRI e PRSMMZ não somam 1; o resto representa a probabilid ade da macaxeira com ambos arroz e milho.
PRSMMZ		INTERP	REAL	Probabilidadc da macaxei ra consorciada com milho.

Variável	Índices	COMMON	Tipo	Definição
PRSMRI		INTERP	REAL	Probabilidade da macaxeira consorciada com arroz. (Ver nota sob PRSM).
PRVI		INTERP	REAL	Probabilidade de Vigna plantada só (distinto de Vigna com milho (verde ou seco) ou com outras culturas).
PRVOLP		PRALCO	REAL	Probabilidade do pagamento voluntário no banco, dado que o dinheiro necessário de subsistência é satisfeito e dado que algum dinheiro é disponível após satisfeita a necessidade de subsistência.
PRZONE	zona	TRANSP	REAL	Proporção de lotes em cada zona. Zonas: 1=beira da estrada, 2= travessão antes da agrovila interior (10 km da estrada), 3=travessão após agrovila interior (10-20 km da estrada).

Variável	Índices	COMMON	Tipo	Definição
PSELLB	cultura	PRALCO	REAL	Probabilidade de vender cada produto ao Banco do Brasil (incluindo vendas "involuntárias"). Ambos os colonos financiados e não financiados estão incluidos. Os produtos são os 10 primeiros códigos dos produtos (ver seção de códigos). Códigos 9 e 10 não são usados.
PTYLAB	tipo de mão-de-obra	WAGELA	REAL	Probabilidade de engajar-se em cada tipo de mão-de-obra segundo o tipo de colono. Tipos de mão-de-obra: 1=diaristas, 2=empresa, 3=empregado do governo ou profissional, 4=mulheres ou crianças que trabalham. Tipos de colonos: 1=empresário, 2=agricultor auto-suficiente, 3=artesão, 4= dependente.

Variável	Índices	COMMON	Tipo	Definição
RAINFL		FIN	REAL	Taxa de inflação (como uma proporção do aumento). (Taxa anual).
REQTL	mês de calendário, operação	REQUIR	REAL	Mão-de-obra total exigida (sem levar em conta idade ou sexo) em equivalentes homem-dia por hectare. Operações: 1=desmatamento de mata virgem, 2=roçagem de capoeira, 3=limpa de ervas daninhas, 4=custeio do arroz (plantio, manutenção, colheita), 5=custeio do milho, 6=custeio de feijão (tanto Phaseolus como Vigna), 7=custeio da mandioca (tanto brava como macaxeira), 8=plantio do cacau, 9=plantio da pimenta, 10=plantio de pastagens sem animais, 11="plantio" (instalação) de pastagens com animais, 12=manutenção do cacau, 13=manutenção da pimenta, 14=manutenção de pastagem sem animais, 15=manutenção de pastagem com animais.

Variável	Índices	COMMON	Tipo	Definição
REQML	Mês de calendário, operação	REQUIR	REAL	Exigências de mão-de-obra masculina (Homem-dias/ha). Ver REQTL para códigos de operações.
REQFC	mês de calendário, operação	REQUIR	REAL	Exigências de custo fixo (Cruzieros de 1º de janeiro de 1975/ha), excluindo o adubo das operações de manutenção (distinto do plantio), e excluindo as sacas (as quais são deduzidas de SELLME). Ver REQTL para códigos de operações.
RMLAME	tipo de mão-de-obra	WAGELA	REAL	Mão-de-obra masculina média (homem-dias/lote/ano) gasta em cada tipo de mão-de-obra, dado que o colono se encaixa neste tipo de mão-de-obra. Tipos de mão-de-obra: 1=diarista, 2= empresa, 3=empregado do governo ou profissional, 4=mulheres ou crianças que trabalham.

Variável	Índices	COMMON	Tipo	Definição
REQML	Mês de calendário, operação	REQUIR	REAL	Exigências de mão-de-obra masculina (Homem-dias/ha). Ver REQTL para códigos de operações.
REQFC	mês de calendário, operação	REQUIR	REAL	Exigências de custo fixo (Cruzieros de 1º de janeiro de 1975/ha), excluindo o adubo das operações de manutenção (distinto do plantio), e excluindo as sacas (as quais são deduzidas de SELLME). Ver REQTL para códigos de operações.
RMLAME	tipo de mão-de-obra	WAGELA	REAL	Mão-de-obra masculina média (homem-dias/lote/ano) gasta em cada tipo de mão-de-obra, dado que o colono se encaixa neste tipo de mão-de-obra. Tipos de mão-de-obra: 1=diarista, 2= empresa, 3=empregado do governo ou profissional, 4=mulheres ou crianças que trabalham.

Variável	Índices	COMMON	Tipo	Definição
RMLASD	tipo de mão-de-obra	WAGELA	REAL	Desvio padrão da mão-de-obra masculina (homem-dias/lote/ano) gasta em cada tipo de mão-de-obra dado que o colono se encaixa neste tipo de mão-de-obra. (Ver RMLAME).
SEED	cultura	PROD	REAL	Exigência de sementes para plantio (kg/ha). Culturas: 1=arroz, 2= milho, 3=Phaseolus, 4= Vigna.
SELLME	produto	COSTS	REAL	Preço de venda médio para os produtos (Cruzeiros de 1º de janeiro de 1975/ kg). Os preços são ajustados por incluir o preço das sacas. Ver seção de códigos para códigos dos produtos.
SELLSD	produto	COSTS	REAL	Desvio padrão do preço de venda dos produtos (Cruzeiros de 1º de janeiro de 1975/kg). Ver SELLME.

Variável	Índices	COMMON	Tipo	Definição
SIZLOT		SIZES	REAL	Tamanho de um lote em hectares.
SLOLI		FERT	REAL	Declividade da regressão do calcário para alteração de pH. Ver Fearnside, 1978, Apêndice E.
SLOPHO		FERT	REAL	Declividade da regressão de fósforo (alterações do fósforo do solo apartir de kg/ha de P_2O_5 aplicado) Ver Fearnside, 1978, Apêndice E.
SMTYPR		MISC	REAL	Probabilidade de macaxeira como tipo de mandioca: probabilidade de que um colono plantará macaxeira em contraposição à mandioca brava em um dado ano, dado que ele planta mandioca.
SPOIME	produto	SPOIL	REAL	Desperdício médio (entre colheita e uso) para produtos guardados para consumo ou mercado (não para sementes). (Proporção) Ver seção de códigos para produtos; apenas os 8 primeiros produtos.

Variável	Índices	COMMON	Tipo	Definição
SPOISD	produto	SPOIL	REAL	Desvio padrão de desperdício para produtos guardados para mercado ou consumo (não sementes) Ver SPOIME.
SPOSME	produto	SPOIL	REAL	Desperdício médio de sementes (proporção estragada antes do uso) para produtos estocados para uso como sementes. Ver seção de códigos para códigos dos produtos.
SPOSSD	produto	SPOIL	REAL	Desvio padrão do proporçã de desperdício das sementes. Ver SPOSME.
START	cultura	TECHN	REAL	Valor inicial de produção (kg/ha) para culturas (produção adubada ou máximo de produção esperada para as variedades presentes na área). Usado como base para desenvolvimento tecnológico (YRLYIM). Culturas: 1=arroz, 2= milho, 3=Phaseolus, 4= Vigna, 5=mandioca brava,

Variável	Índices	COMMON	Tipo	Definição
SUKGMT (continuação)				enlatada).
SUKGMZ		NEED	REAL	Necessidade de subsistência do milho (kg/pessoa/ano). Incluindo o milho utilizado na alimentação de galinhas.
SUKGRI		NEED	REAL	Necessidade de subsistência do arroz (kg/pessoa/ano) (com casca).
TDNPDM		PASTUR	REAL	Nutrientes digeríveis totais como proporção da matéria seca (para gramíneas de pastagens).
TOLAME	tipo de mão-de-obra	WAGELA	REAL	Mão-de-obra total média (homem-dias/lote/ano) utilizada em cada tipo de mão-de-obra dado que o colono se engaje naquele tipo de mão-de-obra. Tipos de mão-de-obra: 1= diarista, 2=empresa, 3=empregado do governo ou profissional, 4=mulheres ou crianças que trabalham.

Variável	Índices	COMMON	Tipo	Definição
TOLASD	tipo de mão-de-obra	WAGELA	REAL	Desvio padrão da mão-de-obra total (homem-dias/ lote/ano) utilizada em cada tipo de mão-de-obra dado que o colono se engaje naquele tipo de mão-de-obra. Ver TOLAME.
TOTPRO	item	NUTRI	REAL	Conteúdo proteico total dos 17 itens (produtos) em equivalentes em kg da proteína do ovo/kg do produto. Ver seção de códigos para códigos dos produtos.
TRANME		PRALCO	REAL	Custo de transporte médio (Cruzeiros de 1º de janeiro de 1975/kg) até o mercado.
TRANSD		PRALCO	REAL	Desvio padrão do custo de transporte (Cruzeiros de 1º de janeiro de 1975/ kg). Ver TRANME.
TUBCAL		TUBERS	REAL	Calorias dos tubérculos: suprimento de milhares de calorias per capita por ano obtido através da alimentação de tubérculos.(Não farinha).

Variável	Índices	COMMON	Tipo	Definição
TUBTP		TUBERS	REAL	Proteína total dos tubérculos: suprimento em gramas da proteína total *per capita* por ano obtido através da alimentação de tuberculos.
UNMODP	padrão de uso da terra, tipo de colono		REAL	Probabilidades não modificadas de cada um dos 4 padrões de uso da terra: 1=culturas anuais para venda, 2=culturas perenes para venda, 3=pecuárista, 4=mão-de-obra externa. Tipos de colonos: 1= empresário, 2=agricultor auto-suficiente, 3= artesão, 4=dependente.
VITYPR		MISC	REAL	Probabilidade de *Vigna* como tipo de feijão: a probabilidade de que um colono plantará *Vigna* em vez de *Phaseolus* em um dado ano, dado que ele planta uma das duas.

Variável	Índices	COMMON	Tipo	Definição
WBMULT		DISEA	REAL	Multiplicador da vassoura de bruxa: a proporção da produção esperada sem o ataque da doença caso o cacau seja atacado pela doença vassoura de bruxa.
WGTPDN		PASTUR	REAL	Ganho em peso como proporção dos nutrientes digeríveis totais: relaciona crescimento do gado ao consumo de gramíneas.
YLDINT		GAME	REAL	"intercept" da queda da produção de caça (kg/ homem-dia esforço de caça): a produção de caça obtida no início do período de colonização.
YLDSLO		GAME	REAL	Declividade da queda da produção de caça (kg/homem-dia esforço de caça).

Variável	Índices	COMMON	Tipo	Definição
YREFF	ano	PASTUR	REAL	Efeito anual: redução da produção do peso seco do pasto causada pela invasão de ervas daninhas. Expressa como uma proporção da produção do primeiro ano. O índice "ano" se refere aos anos de crescimento da pastagem.
YRLYIM	cultura		REAL	Quantidade anual de desenvolvimento tecnológico na produção das culturas (kg/ha aumento/ano). Códigos de culturas: 1=arroz, 2=milho, 3=Phaseolus, 4=Vigna, 5=mandioca brava, 6=macaxiera, 7=cacau, 8=pimenta, 9=pastagem com animais.
ZCRISK		NEED	REAL	Estatística z do risco aceitável do colono da falha da cultura de subsistência (deficiência de qualquer cultura individual: probabilidade por ano).

VARIÁVEIS EXÓGENAS IMPLÍCITAS NO PROGRAMA

Variável	Índices	COMMON	Tipo	Subprograma	Definição
expectativa de vida do cacau			INTEGER	CAYLD	Expectativa de vida de árvores do cacao em dias.
CACRPH			REAL	CAYLD	pH crítico do cacau: valor do pH acima do qual maiores aumentos não levam a maiores produções de cacau.
CAYREF			REAL	CAYLD	Efeito anual do cacau: proporção da produção esperada da árvore madura em cada classe anual. Classes anuais: 1=1 ano, 2=2 anos, 3=3 anos, 4= 4 anos, 5=5 ou mais anos.
PECREC			REAL	PEYLD	Carbono crítico da pimenta: o nível de carbono (% de peso seco) acima do qual não ocorrem mais respostas na produção.
PECRP			REAL	PEYLD	Fósforo crítico da pimenta: o nível de fósforo (ppm) acima do qual não ocorrem respostas na produção.

Variável	Índices	COMMON	Tipo	Subprograma	Definição
PECRPH			REAL	PEYLD	pH crítico da pimenta: o valor de pH acima do qual não mais ocorrem respostas na produção.
expectativa de vida da pimenta			INTEGER	PEYLD	Expectativa de vida das plantas de pimenta em dias.
PEYREF			REAL	PEYLD	Efeito anual da pimenta: proporção da produção da planta madura obtida de plantas em cada classe anual. Classes anuais: 1=1 ano, 2=2 anos, 3=3 anos, 4=4 ou mais anos.
SDEVAP	mês de calendário	MOWEA	REAL	BLOCK DATA	Desvio padrão da evaporação (mm/mês) para cada mês do calendário.
SDINSO	mês de calendário	MOWEA	REAL	BLOCK DATA	Desvio padrão da insolação (horas/mês) para cada mês do calendário.
SDRAIN	mês de calendário	MOWEA	REAL	BLOCK DATA	Desvio padrão da precipitação (mm/mês) para cada mês do calendário.

CÓDIGOS

Nome	Uso	Código	Significado
Categorias de dinheiro	sub-rotinas STRAT e CASHAL	1	lote (desenvolvimento agrícola)
		2	empresa (bodegas, etc.)
		3	consumo
Classes de desmatamento	"AVAIL" na sub-rotina ICLEAR	0	não disponível (já plantado)
		1	ervas daninhas ou limpo (menos que 8 meses desde cultivado)
		3	capoeira 2-3 anos, incluindo o 3º ano (730-1096 dias)
		4	capoeira 4-6 anos, inclusive (1096-2192 dias)
		5	capoeira 7-11 anos, inclusive (2192-4018 dias)
		6	capoeira 12-16 anos, inclusive (4018-5844 dias)
		7	capoeira 17-20 anos, inclusive (5844-7305 dias)
		8	capoeira com mais de 20 anos (7305 dias)
		9	floresta virgem
Tipos de colonos		1	empresário
		2	agricultor auto-suficiente
		3	artesão
		4	dependente

Nome	Uso	Código	Significado
Código da chamada de cultura	códigos "ICRCAL"	1	arroz
		2	arroz + milho
		3	milho
		4	milho + arroz
		5	milho + mandioca (brava ou macaxeira)
		6	milho + outra cultura intercalada
		7	Phaseolus
		8	Phaseolus + milho
		9	Vigna
		10	mandioca brava
		11	macaxeira
Códigos de culturas para TECHNO	Sub-rotina TECHNO	1	arroz
		2	milho
		3	Phaseolus
		4	Vigna
		5	mandioca brava
		6	macaxeira
		7	cacau
		8	pimenta
		9	pastagem com animais
Códigos de doenças de culturas	sub-rotina CDISEA e MAIN	1	Fusarium (doença da pimenta do reino)
		2	vassoura de bruxa (doença do cacau)
		3	podridão parda (doença do cacau)

Nome	Uso	Código	Significado
Códigos de elementos	sub-rotina MAINT e MAIN	1	fósforo
		2	pH
		3	alumínio (Al^{+++})
		4	nitrogênio
		5	carbono
Códigos de estabelecimento (para doenças das culturas)	CDISEA	1	não estabelecida na área
		2	estabelecida na área
Códigos de estrutura familiar	sub-rotina POPGEN	1	idade média do proprietário
		2	desvio padrão da idade do proprietário
		3	probabilidade de o colono ter outros dependentes (além da esposa) para colonos cadados
		4	probabilidade de o colono ter outros dependentes (além da esposa) para colonos solteiros
		5	probabilidade de o colono (proprietário do lote) ter esposa (incluindo amasiados)
		6	idade média da esposa
		7	desvio padrão da idade da esposa
		8	probabilidade de um outro dependente (além da esposa) ser do sexo masculino

Nome	Uso	Código	Significado
(continuação de códigos de estrutura familiar)		9	número médio de outros dependentes (além da esposa)
		10	desvio padrão do número de outros dependentes (além da esposa).
Códigos de usos da terra		1	floresta virgem
		2	solo limpo (< 2 meses desde o cultivo).
		3	ervas daninhas (< 8 meses de idade)
		4	capoeira (≥ 8 meses de idade)
		5	arroz
		6	arroz + milho
		7	milho
		8	Phaseolus
		9	milho verde + Phaseolus
		10	Vigna
		11	milho (verde ou seco) + Vigna
		12	mandioca brava
		13	arroz + mandioca brava
		14	milho + mandioca brava
		15	arroz + milho + mandioca brava
		16	macaxeira
		17	arroz + milho + macaxeira
		18	pastagem sem animais

Nome	Uso	Código	Significado
(Continuação de códigos de usos da terra)		19	arroz + pasto
		20	cacau
		21	pimenta do reino
		22	arroz + macaxeira
		23	pastagem com animais
		24	milho + macaxeira
Uso da terra no auge da época da chuva	LUMAXR	1	floresta virgem
		2	culturas anuais ou solo limpo (< 2 meses)
		3	pimenta do reino
		4	cacau
		5	pastagem (com ou sem animais)
		6	ervas daninhas (2-8 meses)
		7	capoeira (≥ 8 meses)
Uso da terra ("códigos USEPR")	para "AREA" em alocação do uso da terra	1	arroz
		2	milho
		3	Phaseolus
		4	Vigna
		5	mandioca brava
		6	macaxeira
		7	cacau
		8	pimenta do reino
		9	pastagem sem animais
		10	pastagem com animais

Nome	Uso	Código	Significado
Uso da terra ("códigos UTCOM")	"códigos de itens", "LU" e "LASTUS" na sub-rotina USETOT	1	sem categoria
		2	solo limpo (< 2 meses)
		3	culturas anuais
		4	culturas perenes
		5	pastagem (com ou sem animais)
		6	solo em pousio ("ervas daninhas" ou capoeira)
Tipos de empréstimos	Sub-rotina BANK	1	terra e casa
		2	derrubada de mata virgem - tipo 1 (prazo de 8 anos)
		3	derrubada de mata virgem - tipo 2 (prazo de 1 ano)
		4	débito do INCRA (salários, etc.)
		5	outros (moto serra, etc.)
		6	sementes (INCRA)
		7	custeio do arroz (inclusive da roçagem de capoeira)
		8	custeio do milho
		9	custeio do Phaseolus
		10	culturas perenes
		11	gado e pastagem
		12	empréstimos particulares

Nome	Uso	Código	Significado
Códigos de usos da terra "LUOUT"		1	arroz solteiro
		2	arroz consorciado
		3	milho soltiero
		4	milho consorciado
		5	Phaseolus
		6	Vigna
		7	mandioca brava
		8	macaxeira
		9	cacau
		10	pimenta do reino
		11	pastagem com animais
		12	capoeira
Códigos de operações	função LABOR	1	desmatamento de mata virgem
		2	roçagem de capoeira
		3	limpa de ervas daninhas
		4	arroz
		5	milho
		6	Phaseolus ou Vigna ("feijão")
		7	mandioca (brava ou macaxeira)
		8	estabelecimento do cacau
		9	estabelecimento da pimenta
		10	estabelecimento de pastagem sem animais
		11	estabelecimento de pastagem com animais

Nome	Uso	Código	Significado
(Continuação de códigos de operações)			
	Códigos seguintes apenas na sub-rotina MAINT		
		12	manutenção do cacau
		13	manutenção da pimenta do reino
		14	manutenção de pastagem sem animais
		15	manutenção de pastagem com animais
Padrões de mão-de-obra fora do lote	sub-rotinas WAGE e STRAT	0	nenhum
		1	salário diário (diarista)
		2	empresa (bodegas, etc.)
		3	empregado do governo ou outra profissão (motorista, etc.)
		4	mulheres ou crianças que recebem
		5	padrões 1 + 4
		6	padrões 2 + 4
		7	padrões 3 + 3
Tipos de mão-de-obra fora do lote	sub-rotinas WAGE e STRAT	0	nenhum
		1	salário diário (diarista)
		2	empresa (bodegas, etc.)
		3	empregado do governo ou outra profissão (motoristas, etc.)
		4	mulheres ou crianças que recebem

Nome	Uso	Código	Significado
Códigos de culturas perenes	sub-rotina MAINT e MAIN	1	cacau
		2	pimenta do reino
Códigos de produtos	códigos dos "custos" para produtos	1	arroz (com casca)
		2	milho (removido da espiga)
		3	Phaseolus
		4	Vigna
		5	mandioca brava (farinha)
		6	macaxeira (farinha)
		7	cacau
		8	pimenta do reino
		9	calorias
		10	proteína total
		11	proteína animal
		12	gado
		13	galinhas
		14	caça
		15	porcos
		16	carne de porco
		17	carne enlatada

Nome	Uso	Código	Significado
Padrões	itens "STDRD" na sub-rotina MEASUR	1	calorias per capita (fração dos lotes abaixo do padrão)
		2	proteína total per capita (fração dos lotes abaixo do padrão)
		3	proteína animal per capita (fração dos lotes abaixo do padrão)
		4	padrão monetário de vida per capita (fração dos lotes abaixo do padrão)
		5	padrão monetária de vida por família (fração dos lotes abaixo do padrão)
		6	proporção desmatada do lote (fração dos lotes acima do padrão)
		7	proporção desmatada da área (fração da área total)
		8	médias de calorias per capita da área em toda a sua extensão (Kcal/pessoa/dia)
		9	Média de proteína total per capita da área em toda a sua extensão (g/pessoa/dia)
		10	Média de proteína animal per capita da área em toda a sua extensão (g/pessoa/dia)

Nome	Uso	Códigos	Significado
(Padrões, continuação)		11	Média do padrão de vida monetária per capita da área em toda a sua extensão (Cruzeiros de 1º de janeiro de 1975/pessoa/mês)
		12	Média do padrão de vida monetária por família da área em toda a sua extensão (proporção do salário mínimo)
		13	população (pessoas/km^2)
		14	proporção de colonos pioneiros que permanecem
Códigos de estratégia	"LUPAT" na sub-rotina STRAT	1	culturas anuais para venda
		2	culturas perenes para venda
		3	pecuária
		4	mão-de-obra fora do lote
Códigos "USEPR"			ver uso da terra códigos "USEPR"
Códigos "UTCOM"			ver uso da terra códigos "UTCOM"

INTRODUCTION

This volume provides the documentation and FORTRAN source listings for the KPROG2 carrying capacity simulation program. KPROG2 is a program which was written for estimating human carrying capacity in a part of Brazil's Transamazon Highway Colonization Area (Fearnside 1978, 1979b). The program has many features which are designed to facilitate adapting the program to other agroecosystems in the humid tropics.

KPROG2 calculates probability of colonist failure as defined by various different criteria concerning consumption levels and environmental quality. Carrying capacity, which is operationally defined in terms of a gradient of probability of colonist failure (Fearnside 1978, 1979a), can be estimated from these probabilities based on the results of a number of runs. In addition to the calculated probabilities of colonist failure, the values of a number of state variables are output to provide complementary information about system behavior during the simulation runs.

The KPROG2 program can be viewed as being divided into four sectors: land use allocation, agricultural production, product allocation, and population. Intial resource conditions are first generated, followed by iterations of the model which duplicate many of the processes in the colonists' agroecosystem: land, labor, and capital resources are allocated, agricultural and other production is obtained, the proceeds are allocated between different uses including consumption, and the population changes producing different demands and capabilities for subsequent resource allocations.

Information relevant to carrying capacity is drawn from various parts of the agroecosystem and is output, without carrying capacity itself entering into any of the calculations in the system.

The present volume presents information which would be essential to anyone using the program: it is intended as a reference work. Input data are defined, and the values used in the standard runs of the Transamazon Highway study are given as examples. Abbreviations and codes used in the program are explained. The lists and descriptions provided concerning the flow of information between subprograms would be essential to anyone attempting to trace the behavior of individual items. Dimension information is provided which is very useful in changing program dimension requirements; the source listings provided are dimensioned for a community of 10 lots with 100 patches per lot.

The KPROG2 program is written entirely in G-level FORTRAN-IV. The Michigan Terminal System (M.T.S.) operating system has been used; M.T.S. features are identified to facilitate conversion to other operating systems. Calls on M.T.S. system subroutines have been kept to a minimum to make such conversions easier. Extended FORTRAN features such as multiple entry points for subprograms have not been used.

The agricultural production sector of KPROG2 can also be run separately from the other sectors of the program using the program AGRISIM (not described in this volume). This greatly facilitates the examination of yield behavior and soil fertility changes associated with individual crops under different conditions. A separate documentation is planned for AGRISIM.

PROGRAM OPERATIONS SHOWING RELATION OF SUBPROGRAMS

for MAIN program

LOOP	LEVEL	STATEMENT	OPERATION	ROUTINE	OTHER ROUTINES CALLED
			initializations and data input	MAIN	
			initializations	MEASUR	
-------	lots				
I					
I			land purchase and settlement loans	LOANG	
I					
I -----	patches				
I I					
I I			initial soil quality generation	INITSQ	
I I					
I -----		101			
I					
I			initial population (age and sex		
I					
I			distributions), initial colonist		
I					
I			backgrounds, initial capital	POPGEN	
I					
-------		100			
-------	years				
I					
I			weather generation	WEAGEN	NODIM
I					
I			technological improvement	TECHNO	
I					
I			crop diseases	CDISEA	
I					
I			buying and selling prices	PRICES	
I					
I			land use allocation	LUALLO	(see separate table)
I					

(continued on next page)

(PROGRAM OPERATIONS SHOWING RELATION OF SUBPROGRAMS: FOR MAIN PROGRAM, continued)

LOOP	LEVEL	STATEMENT	OPERATION	ROUTINE	OTHER ROUTINES CALLED
I	(years, continued)				
I					
I	----- lots				
I I					
I I	--- patches				
I I I					
I I I			erosion loss prediction	EROSN	
I I I					
I I I			soil change	SOILCH	PASTSO
I I I					
I I I					VBUEFF
I I I					
I I I					CBUEFF
I I I					
I I I					WBUEFF
I I I					
I I I			lot production	LOTPRO	RIYLD, MZYLD, PSYLD,
I I I					
I I I					VIYLD, BMYLD, SMYLD,
I I I					
I I I					CAYLD, PEYLD, PAYLD,
I I I					
I I I					USECNT, LEARN
I I I					
I I ---		104			
I I					
I I			product allocation	PRALLO	BANK
I I					
I I					ITPORT
I I					
I I					BUFFER - LOANG
I I					
I I					PAYBNK - CASHAL
I I					
I I					MEASUR (for cash)
I I					

(continued on next page)

(PROGRAM OPERATIONS SHOWING RELATION OF SUBPROGRAMS: FOR MAIN PROGRAM, continued)

LOOP	LEVEL	STATEMENT	OPERATION	ROUTINE	OTHER ROUTINES CALLED
I	(years, continued)				
I					
I	I (lots, continued)				
I	I				
I	I		population processes	POPUL	
I	I				
I	I		nutrition measures	MEASUR	
I	I				
I	I		family unit emigration, newcomer	LEAVE	POPGEN
I	I				
I	I		population generation		
I	I				
I	-----	103			
I					
I			area-wide statistics, carrying	MEASUR	
I					
I			capacity measures		
I					
I					
I					
I			output lists	MAIN	
I					
I			soil quality output	SQOUT	
I					
-------		102			
			output plots	OUTPUT	

PROGRAM OPERATIONS SHOWING RELATION OF SUBPROGRAMS

for land use allocation subroutine

LOOP	LEVEL	STATEMENT	OPERATION	ROUTINE	OTHER ROUTINES CALLED
-------	lots				
I			resource allocation strategies	STRAT	CASHAL
I			probabilities of land uses	PROBLU	
I			subsistence needs determination	SUBSIS	
I			wage labor	WAGE	
I			health effects on labor	HEALTH	
I	-----	patches			
I I			land clearing, financing	ICLEAR	IFINAN - LOANG
I I			seed need, storage, and expenses	SEEDS	IFINAN - LOANG
I I			agricultural loans	LOANG	
I I			labor and capital sufficiency checks, hunting	LABOR	HUNT
I I			allocation of land, burn qualities	ALLOC	VBQ - WEABD - IDAGYR - IDAYYR - NDAYS SGBQ - WEABD - IDAGYR - IDAYYR - NDAYS

(continued on next page)

(PROGRAM OPERATIONS SHOWING RELATION OF SUBPROGRAMS: FOR LAND USE ALLOCATION SUBROUTINE, continued)

LOOP	LEVEL	STATEMENT	OPERATION	ROUTINE	OTHER ROUTINES CALLED
I (lots, continued)					
I					
I I (patches, continued)					
I I					
I I			maintenance of perenial crops	MAINT	
I I					
I I			(first call only)		
I I					
I I			land use totals	USETOT	MAXRA - WEABD
I I					
I -----		101			
I					
-------		100			

SUBPROGRAMS IN ORDER OF FIRST CALL

1.) MAIN main program (KPROG2)
2.) MEASUR carrying capacity measures
3.) LOANG loan granting
4.) INITSQ initial soil quality generation
5.) POPGEN population generation
6.) BLOCK DATAdeclared input data
7.) WEAGEN weather generation
8.) NODIM number of days in month
9.) TECHNO technological improvement
10.) CDISEA crop diseases
11.) PRICES buying and selling prices
12.) LUALLO land use allocation decisions
13.) STRAT strategy of resource allocation
14.) CASHAL cash allocation
15.) PROBLU probability of land use
16.) SUBSIS subsistence demand
17.) LABEQU labor equivalents
18.) WAGE wage labor
19.) HEALTH human health
20.) ICLEAR clearing
21.) IFINAN financing
22.) SEEDS seed storage need calculation
23.) LABOR labor and capital sufficiency checks
24.) HUNT hunting
25.) ALLOC allocation of land
26.) VBQ virgin burn quality
27.) IDAGYR day of agricultural year given agricultural month
28.) IDAYYR day of agricultural year given calendar month
29.) NDAYS number of days elapsed
30.) WEABD weather between dates

31.) MAINT maintenance of perennial crops, pasture, and animals
32.) USETOT land use totals
33.) MAXRA maximum rainfall
34.) EROSN erosion loss prediction
35.) SOILCH soil changes
36.) UNBUCH unburned soil changes
37.) VBUEFF virgin burn effects
38.) LOTPRO lot production
39.) RIYLD rice yield
40.) MZYLD maize yield
41.) PSYLD *Phaseolus* yield
42.) VIYLD *Vigna* yield
43.) BMYLD bitter manioc yield
44.) SMYLD sweet manioc yield
45.) CAYLD cacao yield
46.) PEYLD pepper yield
47.) PAYLD pasture yield
48.) USECNT land use counting
49.) LEARN learning in land use allocation behavior
50.) PRALLO product allocation
51.) ITPORT transport availability
52.) BANK bank loans
53.) PAYBNK payment of bank loans
54.) POPUL population (demographic processes)
55.) LEAVE colonist turnover
56.) SQOUT soil quality output
57.) WBUEFF weed burn effects
58.) SGBQ second growth burn quality
59.) CBUEFF "capoeira" (second growth) burn effects
60.) PASTSO pasture soils
61.) OUTPUT output of carrying capacity measures

SUBPROGRAMS BY DIMENSION REQUIREMENTS

SUBPROGRAMS WITH NO ARRAYS DIMENSIONED FOR NUMBER OF LOTS AND NUMBER OF PATCHES

ARAND	uniformly distributed random number
BLOCK DATA	declared input data
BRAND	normally distributed random number
IDAGYR	day of agricultural year given agricultural month
IDAYYR	day of agricultural year given calendar month
ITPORT	transportation availability
LEARN	learning in land use allocation behavior
MAXRA	maximum rainfall
NDAYS	number of days elapsed
NODIM	number of days in month
OUTPUT	output of carrying capacity measures
PRICES	buying and selling prices
TECHNO	technological improvement
USECNT	land use counting
WBUEFF	weed burn effects
WEABD	weather between dates
WEAGEN	weather generation

SUBPROGRAMS WITH ONLY NUMBER OF LOTS DIMENSIONED

BANK	bank loans
BUFFER	buffers against colonist failure
CASHAL	cash allocation
HEALTH	human health
HUNT	hunting
IFINAN	financing
LABEQU	labor equivalents
LEAVE	colonist turnover
LOANG	loan granting

(SUBPROGRAMS WITH ONLY NUMBER OF LOTS DIMENSIONED, continued)

MEASUR	carrying capacity measures
PAYBNK	payment of bank loans
POPGEN	population generation
POPUL	population (demographic processes)
PRALLO	product allocation
PROBLU	probability of land use
SEEDS	seed storage need calculation
STRAT	strategy of resource allocation
SUBSIS	subsistence demand
WAGE	wage labor

SUBPROGRAMS WITH ARRAYS DIMENSIONED FOR BOTH NUMBER OF LOTS AND NUMBER OF PATCHES

ALLOC	allocation of land
BMYLD	bitter manioc yield
CAYLD	cacao yield
CBUEFF	"capoeira" (second growth) burn effects
CDISEA	crop diseases
EROSN	erosion loss prediction
ICLEAR	clearing
INITSQ	initial soil quality generation
LABOR	labor and capital sufficiency checks
LOTPRO	lot production
LUALLO	land use allocation decisions
MAIN	main program (KPROG2)
MAINT	maintenance of perennial crops, pasture, and animals
MZYLD	maize yield
PASTSO	pasture soils
PAYLD	pasture yield

(SUBPROGRAMS WITH ARRAYS DIMENSIONED FOR BOTH NUMBER OF LOTS AND NUMBER OF PATCHES, continued)

PEYLD	pepper yield
PSYLD	*Phaseolus* yield
RIYLD	rice yield
SGBQ	second growth burn quality
SMYLD	sweet manioc yield
SOILCH	soil changes
SQOUT	soil quality output
UNBUCH	unburned soil changes
USETOT	land use totals
VBQ	virgin burn quality
VBUEFF	virgin burn effects
VIYLD	*Vigna* yield

ARRAYS BY DIMENSION REQUIREMENTS

ARRAYS WITH ONLY NUMBER OF LOTS DIMENSIONED

ARRAY NAME	COMMON
AMTLO	FIN
AREACL	COLON
CAPCON	COLON
CAPENT	COLON
CAPIT	COLON
CGOCON	COLON
CGOENT	COLON
CGOODS	COLON
EATGAM	FOOD
FAMLAB	COLON
FAMSIZ	COLON
IAVAIL	none (in subroutine LUALLO)
ICAT	none (in function ICLEAR)
IDONE	none (in function ICLEAR)
IFEM	POP
IHUNT	GAME
IORIG	COLON
ISOLV	FIN
LABPAT	WAGELA
LOANDA	FIN
LOANTY	FIN
LUPAT	COLON
MALE	POP
MALES	COLON
MARIT	POP

(ARRAYS WITH ONLY NUMBER OF LOTS DIMENSIONED, continued)

ARRAY NAME	COMMON
MORTYP	COLON
PDEP	POP
SEEDST	PROD

ARRAYS WITH BOTH NUMBER OF LOTS AND NUMBER OF PATCHES DIMENSIONED

AL	SOIL
BUQUAL	BURNS
BUTYP	BURNS
CARB	SOIL
CLAY	SOIL
CONTIN	USECOM
DAYSAC	UTCOM
DAYSBA	UTCOM
DAYSFA	UTCOM
DAYSPA	UTCOM
DAYSTC	UTCOM
IBPOD	DISEA
IDUR	USECOM
IFERT	FERT
IFUSAR	DISEA
IWBROO	DISEA
LASTUS	USECOM
LUMAXR	UTCOM
LUSE	USECOM

(ARRAYS WITH BOTH NUMBER OF LOTS AND NUMBER OF PATCHES DIMENSIONED, continued)

ARRAY NAME	COMMON
NITRO	SOIL
PH	SOIL
PHOS	SOIL
RAINAC	UTCOM
RAINBA	UTCOM
SLOPE	SOIL
VIRGSO	HISTOR

NOTE: values of LTSMAX (maximum number of lots) and NPMAX (maximum number of patches) must also be set in routine MAIN.

COMMON AREAS WITH VARIABLES AND DIMENSIONS

COMMON	Variables	Dimensions	Indices	Subprograms
AREAS	AREA	10	land uses ("USEPR" codes)	PRALLO, LOTPRO, MAIN
BEFORE	PHBEFF			CBUEFF, SOILCH,
	ALBEFF			VBUEFF, WBUEFF
	CBEFF			
	RNBEFF			
	PBEFF			
BQCALL	LLOTV			MAIN, VBQ, SGBQ
	LYRV			
	LLOTSG			
	LYRSG			
	LLOTW			
	LYRW			
BUCHNG	PHCH			CBUEFF, SOILCH,
	ALCH			VBUEFF, WBUEFF
	PCH			
	RNCH			
BUPROB	BURNPR	3	burn types	MAIN, ALLOC
BURNS	BUTYP	10, 100	lots, patches	CBUEFF, SGBQ, SOILCH, VBQ,
	BUQUAL	10, 100	lots, patches	VBUEFF, LUALLO, ALLOC
CASHPR	PRINME	4	colonist types	CASHAL, STRAT, WAGE
	PRINSD	4	colonist types	
	PILOME			
	PILOSD			
	PRCG	3, 4	cash category, colonist type	

COMMON	Variables	Dimensions	Indices	Subprograms
COLON	LUPAT	10	lots	BANK, BUFFER,
	CAPIT	10	lots	CASHAL, HEALTH,
	CGOODS	10	lots	HUNT, IFINAN, LEAVE,
	AREACL	10	lots	LABEQU, LABOR, LOANG,
	FAMLAB	10	lots	LUALLO, MAIN, MAINT,
	MALES	10	lots	MEASUR, POPGEN, POPUL,
	FAMSIZ	10	lots	PRALLO, PROBLU, STRAT,
	CGOENT	10	lots	SUBSIS, WAGE, ICLEAR
	CAPCON	10	lots	
	MORTYP	10	lots	
	IORIG	10	lots	
	CGOCON	10	lots	
	CAPENT	10	lots	
COSTS	COLAB	12	calendar months	LABOR, MAINT, PRALLO, PRICES, SEEDS, MAIN,
	BUYME	17	products	SUBSIS
	BUYSD	17	products	
	SELLME	17	products	
	SELLSD	17	products	
DATE	IYR			BANK, BUFFER, CAYLD, CDISEA, HUNT, IDAGYR, IFINAN, ITPORT, LABOR, LEARN, LOANG, MAIN, MEASUR, NODIM, PEYLD, PRALLO, SEEDS, SGBQ, STRAT, SUBSIS, TECHNO, USETOT, VBQ, WEABD, SQOUT
DEMAND	HARI			SUBSIS, LUALLO, LABOR
	HAMZ			
	HABE			
	HAMN			

COMMON	Variables	Dimensions	Indices	Subprograms
DETERM	ISTOCH			ALLOC, LUALLO, MAIN, STRAT
DISEA	PINFEC	3, 2	diseases, establishment statuses	CAYLD, CDISEA, MAIN, PEYLD
	LSPORE	3	diseases	
	IBPOD	10, 100	lots, patches	
	IWBROO	10, 100	lots, patches	
	IFUSAR	10, 100	lots, patches	
	IWBEST			
	IFUEST			
	IBPEST			
	BPMULT			
	WBMULT			
	FUMULT			
	PRDIES	3	diseases	
EROCOM	EROS			EROSN, VBUEFF
EXPECT	EYSUM	6	crops	LEARN, SUBSIS
	EYNUM	6	crops	
	EYSSQ	6	crops	
FERT	ELLIM	2	elements	MAIN, MAINT, PEYLD,
	DOSECA	4, 2, 3	elements, soil levels, year classes	SOILCH
	DOSEPE	4, 2, 4	elements, soil levels, year classes	
	PRICFE	5	fertilizers	
	PFERT	2	perennial crops	

COMMON	Variables	Dimensions	Indices	Subprograms
(FERT continued)	SLOLI			
	CONSLI			
	ALLIME			
	SLOPHO			
	CONPHO			
	IFERT	10, 100	lots, patches	
FICOST	FINLSD			LOANG, MAIN
	FINLME			
	FICOSD			
	FICOME			
	PRFINL	12	calendar months	
FIN	ISOLV	10	lots	BANK, BUFFER, IFINAN,
	DUEPRI	20	maximum number of loans	LEAVE, LOANG, MAIN, PAYBNK, PRALLO
	DUEINT	20	max. no. of loans	
	AMTLO	10, 20	lot, max. no. of loans	
	LOANDA	10, 20	lot, max. no. of loans	
	LOANTY	10, 20	lot, max. no. of loans	
	MAXNLO			
	RAINFL			
FINPCH	FINPC			IFINAN, LOANG
FLAB	FLTOT	12	calendar months	HEALTH, HUNT, LABOR, LOANG, LUALLO, MAINT,
	FLMALE	12	calendar months	WAGE
	LABCAL			

COMMON	Variables	Dimensions	Indices	Subprograms
FOOD	EAT	17	products	HUNT, POPUL, PRALLO,
	SUBNCH			MAIN
	EATGAM	10	lots	
FPROBS	PRFIN	12	loan types	BUFFER, IFINAN, MAIN
GAME	SMEAT			HUNT, LEAVE, MAIN,
	IHUNT	10	lots	PRALLO, STRAT
	PHUNT			
	IENDHU			
	EFFORT	12	calendar months	
	YLDSLO			
	YLDINT			
	EFFSLO			
	EFFINT			
	GWASTE			
HISTOR	VIRGSO	10, 100	lots, patches	INITSQ, LUALLO, PSYLD
INTERP	PRI			ALLOC, MAIN
	PRIMZ			
	PRIBM			
	PRISM			
	PRIMZS			
	PRIPA			
	PRPS			
	PRVI			
	PRBM			
	PRBMRI			
	PRBMMZ			
	PRSM			
	PRSMRI			
	PRSMMZ			
	PRIMZB			

COMMON	Variables	Dimensions	Indices	Subprograms
KMEAS	CALOPC			MEASUR, POPUL
	PROTPC			
	ANPRPC			
LOANS	PCINTI	I2	loan types	BANK, IFINAN, LOANG,
	PCINT2	I2	loan types	LUALLO, MAIN, ICLEAR
	MONCOR	I2	loan types	
	IPERIO	I2	loan types	
	IGRACE	I2	loan types	
	AMTPHA	I2	loan types	
	HAFIME	I2	loan types	
	HAFISD	I2	loan types	
	IBEGYR	I2	loan types	
	IENDYR	I2	loan types	
LUOUT	USEOUT	3, I2	items, land use codes ("LUOUT" codes)	MAIN, USECNT
	LOTUSE	I2	land use codes ("LUOUT" codes)	
MATRIX	PROB	7, 7, 2	after move classes, before move classes, distances	INITSQ, MAIN
MISC	SMTYPR			LUALLO, MAIN
	VITYPR			
MOWEA	SDRAIN	I2	calendar months	BLOCK DATA, WEAGEN
	SDEVAP	I2	calendar months	

COMMON	Variables	Dimensions	Indices	Subprograms
(MOWEA continued)	SDINSO	12	calendar months	
NEED	SUKGRI			HUNT, PRALLO, SUBSIS
	SUKGMZ			
	SUKGBE			
	SUKGMN			
	SUCASH			
	ZCRISK			
	SUKGMT			
NUTRI	CALOR	17	products	MAIN, POPUL
	TOTPRO	17	products	
	ANIPRO	17	products	
OUTSID	PCRECD			MAIN, PRALLO
	CRECME			
	CRECSD			
	PCSENT			
	CSENME			
	CSENSD			
PASTUR	BASEPY			PAYLD, MAIN
	YREFF	5	year classes	
	PACOEF			
	PACONS			
	PACHIP			
	WGPTDN			
	TDNPDM			
POP	MALE	10; 86	lots, ages	HEALTH, LEAVE, LABEQU,
	IFEM	10, 86	lots, ages	MAIN, POPGEN, POPUL
	FAMSTR	10, 2	items, original colonist statuses	

COMMON	Variables	Dimensions	Indices	Subprograms
(POP continued)	PDEP	86, 2	ages, original colonist statuses	
	FLEQUI	2, 5	sexes, labor age classes	
	PDEATH	2, 86	sexes, ages	
	PINDEM	2, 86	sexes, ages	
	PINDIM			
	PBIRTH	44	ages	
	CALAGE	8	calorie factor age classes	
	PROAGE	19	protein factor age classes	
	MARIT	10	lots	
	PMARRY			
	AGBRME			
	AGBRSD			
	PMIMIG			
	PRIMAG	2, 86	sexes, ages	
	CALREQ	25	calorie requirement age classes	
	PROREQ	8	protein requirement age classes	
PRALCO	PSELLB	10	products	MAIN, PRALLO
	PRVOLP			
	PPLPAY			
	TRANME			
	TRANSD			

COMMON	Variables	Dimensions	Indices	Subprograms
(PRALCO continued)	BTRCME			
	BTRCSD			
	CHICMZ			
	CWASTE			
PRIC	YRBUPR	17	products	HUNT, PRALLO, PRICES,
	YRSEPR	17	products	SEEDS, SUBSIS
PROD	PRES	17	products	LOTPRO, LUALLO, MAIN,
	SEEDST	10, 4	lots, seed crops	PRALLO, SEEDS
	SEED	4	seed crops	
RANDOM	INIT			ALLOC, BUFFER, CBUEFF, CDISEA, HEALTH, ICLEAR, INITSQ, ITPORT, LEAVE, LUALLO, MAIN, MAINT, MZYLD, POPGEN, POPUL, PRALLO, PSYLD, RIYLD, SGBQ, STRAT, VBQ, VIYLD, UNBUCH, WBUEFF
REQUIR	REQTL	12, 15	calendar months, operations	LABOR, MAIN, MAINT, SUBSIS
	REQML	12, 15	calendar months, operations	
	REQFC	12, 15	calendar months, operations	
SEEDNE	SEEDN			LUALLO, SEEDS
	SEEDCN			
	ISCALL			

COMMON	Variables	Dimensions	Indices	Subprograms
SICK	DALOME	3	diseases	HEALTH, MAIN
	DALOSD	3	diseases	
	PDISEA	3, 2, 13	diseases, sexes, disease age classes	
	PDISMO	3, 12	diseases, calendar months	
SIZES	LOTS			CDISEA, ICLEAR, IFINAN,
	NOPCHS			LABOR, LOANG, LOTPRO,
	SIZLOT			LUALLO, MAIN, MAINT,
	SIZPCH			MEASUR, SEEDS, STRAT, SQOUT
SOIL	PHOS	10, 100	lots, patches	BMYLD, CAYLD, CBUEFF,
	PH	10, 100	lots, patches	EROSN, INITSQ, MAIN,
	AL	10, 100	lots, patches	MAINT, MZYLD, PAYLD,
	NITRO	10, 100	lots, patches	PEYLD, PSYLD, RIYLD,
	CARB	10, 100	lots, patches	SMYLD, SOILCH, UNBUCH,
	CLAY	10, 100	lots, patches	VIYLD, VBUEFF, PASTSO,
	SLOPE	10, 100	lots, patches	SQOUT
SPOIL	ESPOIL	10	products	MAIN, PRALLO, SUBSIS
	SPOIME	10	products	
	SPOISD	10	products	
	SPOISME	10	products	
	SPOISSD	10	products	
STAND	CALMIN			MAIN, MEASUR, OUTPUT
	PROMIN			
	ANPMIN			
	CHPFMI			

COMMON	Variables	Dimensions	Indices	Subprograms
USEPR	PLU	4, 10	strategies, crops	LUALLO, MAIN
	PCAGPE			
	PPEGCA			
UTCOM	LUMAXR	10, 100	lots,patches	CBUEFF, EROSN, SOILCH,
	DAYSBA	10, 100	lots,patches	UNBUCH, USETOT, SQOUT
	DAYSAC	10, 100	lots,patches	
	DAYSTC	10, 100	lots,patches	
	DAYSPA	10, 100	lots,patches	
	DAYSFA	10, 100	lots,patches	
	RAINBA	10, 100	lots,patches	
	RAINAC	10, 100	lots,patches	
VIRGCL	IVCLFI			ALLOC, ICLEAR, LUALLO
WAGELA	LABPAT	10	lots	CASHAL, LEAVE, STRAT,
	PTYLAB	4, 4	labor types, colonist types	WAGE
	TOLAME	4	labor types	
	TOLASD	4	labor types	
	RMLAME	4	labor types	
	RMLASD	4	labor types	
	EARNME	4	labor types	
	EARNSD	4	labor types	
	PLEAVE	2, 4	marital statuses, colonist types	
WEACOM	RAIN	366	days	MAXRA, WEABD, WEAGEN
	EVAP	366	days	
	RINSOL	366	days	

COMMON	Variables	Dimensions	Indices	Subprograms
WEATOT	RAINSU			SGBQ, WEATOT, WEABD
	EVAPSU			
	RINSSU			
WEEDS	CONMAX			MAIN, ICLEAR
YIELDS	YLDRI			BMYLD, CAYLD, LOTPRO,
	YLDMZ			MZYLD, PAYLD, PEYLD,
	YLDPS			PSYLD, RIYLD, SMYLD,
	YLDVI			VIYLD
	YLDBM			
	YLDSM			
	YLDPE			
	YLDCA			
	YLDPA			
YLDCAL	ICRCAL	11	crop call codes	MAIN, RIYLD, MZYLD, BMYLD, SMYLD, VIYLD, PSYLD

ENDOGENOUS VARIABLES

Variable	Indices	COMMON	Type	Definition
AL	LOT, IPCH	SOIL	DOUBLE PRECISION	Aluminum (Al^{+++}) in the soil of the lot and patch in ME/100g
ALBEFF		BEFORE	DOUBLE PRECISION	Aluminum (Al^{+++}) of before field (ME/100g)
ALCH		BUCHNG	DOUBLE PRECISION	Aluminum (Al^{+++}) change (ME/100g)
AMTLO	LOT, loan number	FIN	REAL	Amount of loan for this loan number (Cruzeiros of Jan. 1, 1975)
ANPRPC		KMEAS	REAL	Animal protein per capita: a computed carrying capacity measure (grams/person/da
AREA	use (see USEPR codes)	AREAS	REAL	Area in hectares in each of 10 uses
AREACL	LOT	COLON	REAL	Area cleared in hectares for the lot (all non-virgin land)
BUQUAL	LOT, IPCH	BURNS	INTEGER	Burn quality (1=bad, 2=good)
BUTYP	LOT, IPCH	BURNS	INTEGER	Burn type (1=virgin, 2=second growth, 3=weeds)
CALOPC		KMEAS	REAL	Calories per capita: computed carrying capacity measure for the lot (Kcal/perso
CAPCON	LOT	COLON	REAL	Capital for consumption (Cruzeiros of Jan. 1, 1975)
CAPENT	LOT	COLON	REAL	Capital for investment in enterprises (Cruzeiros of Jan. 1, 1975)
CAPIT	LOT	COLON	REAL	Capital for investment in the lot (as distinguished from enterprise and consumption capital) (in Cruzeiros of Jan. 1, 1975)

Variable	Indices	COMMON	Type	Definition
CARB	LOT, IPCH	SOIL	DOUBLE PRECISION	Carbon in the soil of the lot and patch (% dry weight)
CBEFF		BEFORE	DOUBLE PRECISION	Carbon of the before field (% dry weight)
CGOCON	LOT	COLON	REAL	Capital (durable) goods for consumption (value in Cruzeiros of Jan. 1, 1975)
CGOENT	LOT	COLON	REAL	Capital goods for enterprises (Cruzeiros of Jan. 1, 1975)
CGOODS	LOT	COLON	REAL	Capital goods for use in lot (agriculture) production (value in Cruzeiros of Jan. 1, 1975)
CLAY	LOT, IPCH	SOIL	DOUBLE PRECISION	Clay content of soil for lot and patch (% of particulate weight)
CONTIN	LOT, IPCH	USECOM	REAL	Days of continuous cultivation as of the last day of the previous agricultural year. (Here cultivation includes annual crops, perennial crops, pasture, and bare soil).
DAYSAC	LOT, IPCH	UTCOM	REAL	Days annual crops (during the year)
DAYSBA	LOT, IPCH	UTCOM	REAL	Days bare (during the year)
DAYSFA	LOT, IPCH	UTCOM	REAL	Days fallow (weeds or second growth) (during the year)
DAYSTC	LOT, IPCH	UTCOM	REAL	Days "tree" crops (cacao or pepper) during the year
DAYSPA	LOT, IPCH	UTCOM	REAL	Days pasture (during the year)
DUEINT	loan number	FIN	REAL	Amount of interest due on this loan number (Cruzeiros of Jan. 1, 1975)
DUEPRI	loan number	FIN	REAL	Amount of principal due for this loan number (Cruzeiros of Jan. 1, 1975)

Variable	Indices	COMMON	Type	Definition
EAT	product (see product codes)	FOOD	REAL	Kg of the product eaten for the family and year.
EATGAM	LOT	FOOD	REAL	Game eaten (kg/lot in the year)
EROS		EROCOM	REAL	Erosion in millimeters in the patch and year
EVAP	day of the calendar year	WEACOM	REAL	Evaporation in millimeters
EVAPSU		WEATOT	REAL	Evaporation sum (sum of mm of evaporation between the dates used in query of WEABD)
EYNOM	crop	EXPECT	REAL	Expected yield number (number of patches used in totals for EYSUM and EYSSQ) crops: 1=rice, 2=maize 3=Phaseolus, 4=Vigna 5=bitter manioc, 6=sweet manioc.
EYSSQ	crop	EXPECT	REAL	Expected yield sum of squares. Crops same as EYNOM.
EYSUM	crop	EXPECT	REAL	Expected yield sum for the crop (total of kg/ha in patches). Crops same as EYNOM.
FAMLAB	LOT	COLON	REAL	Total family labor force in adult male man-day equivalents for the year.
FAMSIZ	LOT	COLON	REAL	Family size (number of persons of any sex or age class including individual immigrants).

Variable	Indices	COMMON	Type	Definition
FINPC		FINPCH	REAL	Number of patches financed (used in LOANG in calculating installment for subtraction of financing costs from CAPIT).
FLMALE	calendar month	FLAB	REAL	Family labor male (adult males only) for this calendar month (man-days)
FLTOT	calendar month	FLAB	REAL	Family labor total (adult male man-day equivalents). This is for persons of all age and sex categories.
HABE		DEMAND	REAL	Hectares of beans (either Phaseolus or Vigna) which colonist expects will be needed to supply the subsistence needs of his family.
HAMN		DEMAND	REAL	Hectares of manioc (either sweet or bitter) which colonist expects will be needed to supply the subsistence needs of his family.
HAMZ		DEMAND	REAL	Hectares of maize which colonist expects will be needed to supply the subsistence needs of his family.
HARI		DEMAND	REAL	Hectares of rice which colonist expects will be needed to supply the subsistence needs of his family.
IBPEST		DISEA	INTEGER	Indicator that black pod disease is established in the area. (1=no, 2=yes).
IBPOD	LOT, IPCH	DISEA	INTEGER	Black pod indicator for patch. (0=no, 1=yes).

Variable	Indices	COMMON	Type	Definition
ICRCAL	crop call code (see codes section)	YLDCAL	INTEGER	Crop call: number of calls on yield subroutines for a given crop code in a given lot and year. Used to identify first calls for a lot and year for calculation of the multipliers and crop planting densities for the year. Values: 0=not called yet for lot and year and crop, 1=called previously for lot and year and crop.
IDUR	LOT, IPCH	USECOM	INTEGER	Duration of the UTCOM code status for this patch as of the last day of the previous agricultural year. Duration in days. (see codes section for UTCOM codes).
IFERT	LOT, IPCH	FERT	INTEGER	Fertilizer indicator: indicates that a patch has been fertilized. (0=not fertilized, 1=fertilized).
IFEM	LOT, age	POP	INTEGER	Number of females in the lot for each of the 86 demographic age classes.
IFUEST		DISEA	INTEGER	Indicator that Fusarium is established in the area. (1=no, 2=yes).
IFUSAR	LOT, IPCH	DISEA	INTEGER	Fusarium indicator for patch. (0=no, 1=yes).
IHUNT	LOT	GAME	INTEGER	Hunter status of colonist (1=hunter, 2=not a hunter).
IORIG	LOT	COLON	INTEGER	Original colonist code (1=original, 2=newcomer).

Variable	Indices	COMMON	Type	Definition
IPCH			INTEGER	Patch number
ISCALL		SEEDNE	INTEGER	Indicator for calls on SEEDS subroutine. (0=not called before for lot and year, 1=called before).
ISOLV	LOT	FIN	INTEGER	Solvency code for colonist (for bank loan eligibility). (1=solvent, 2=insolvent).
IVCLFI		VIRGCL	INTEGER	Virgin financing indicator (used by ICLEAR to communicate to LUALLO whether or not the patch number returned has been financed for virgin clearing). (0=not financed, 1=financed).
IWBEST		DISEA	INTEGER	Indicator that witches' broom is established in area. (1=no, 2=yes).
IWBROO	LOT, IPCH	DISEA	INTEGER	Witches' broom indicator for lot and patch. (0=no, 1=yes).
IYR		DATE	INTEGER	Year (starting at 1 at beginning of simulation).
LABCAL		FLAB	INTEGER	Labor calls (calls on LABOR function). (1=first call for lot and year, 2=later calls).
LABPAT	LOT	WAGELA	INTEGER	Labor pattern code (0=none, 1=daily wage, 2=enterprise (stores, etc.), 3=government or other profession, 4=earning women and children, 5=1+4, 6=2+4, 7=3+4).
LASTUS	LOT, IPCH	USECOM	INTEGER	The UTCOM code for the patch as of the last day of the previous agricultural year. (see codes section).

Variable	Indices	COMMON	Type	Definition
LLOTSG		BQCALL	INTEGER	Last lot second growth: the last lot for which a call was made on SGBQ.
LLOTV		BQCALL	INTEGER	Last lot virgin: the last lot virgin burn quality indicator (number of the last lot for which a call on VBQ was made
LLOTW		BQCALL	INTEGER	Last lot weed: the last lot for which a call was made on WBQ (note: WBQ, the weed burn quality subroutine is not included in the present version of KPROG2)
LOANDA	LOT, loan number	FIN	INTEGER	Loan date (starting with 1 as first year of simulation) for this loan number. (IYR for year of granting of loan).
LOANTY	LOT, loan number	FIN	INTEGER	Loan type for this loan number. (1=land and house, 2=virgin felling of first type (8 yr. period, includes "broca" and "coivara"), 3=virgin felling of second type (1 yr. period, includes "broca" and "coivara", 4=INCRA debt (sal.) 5=other durable items debt (power saws, etc.), 6=INCRA seeds, 7=rice "custeio" (including second growth clearing), 8= maize "custeio", 9=Phaseolus "custeio", 10=perennial crops (cacao & pepper), 11=cattle and pasture, 12=private).
LOT			INTEGER	Lot number
LOTUSE	land use code (LUOUT code)	LUOUT	INTEGER	Indicator of whether the lot has the land use present: used for computation of USEOUT measures for proportion of

Variable	Indices	COMMON	Type	Definition
LUMAXR	LOT, IPCH	UTCOM	INTEGER	Land use at maximum rainfall: the land use code on the day in which the most rain fell in 24 hours. 1=virgin, 2=annual crops or bare, 3=pepper, 4=cacao, 5=pasture, 6=weeds, 7=second growth.
LUPAT	LOT	COLON	INTEGER	Land use pattern. 1=annual cash crops, 2=perennial cash crops, 3=ranching, 4=outside labor.
LUSE	LOT, IPCH	USECOM	INTEGER	Land use of the patch. See land use codes.
LYRSG		BQCALL	INTEGER	Last year second growth: the last year for which a call was made on SGBQ.
LYRV		BQCALL	INTEGER	Last year virgin: the last year for which a call was made on VBQ.
LYRW		BQCALL	INTEGER	Last year weed: the last year for which a call was made on WBQ. Note that WBQ (weed burn quality subroutine) does not appear in current version of KPROG2.
MALE	LOT, age	POP	INTEGER	Number of males in the lot in each of the 86 demographic age classes.
MALES	LOT	COLON	INTEGER	Male labor in lot (adult male man-days/ year).
MARIT	LOT	POP	INTEGER	Marital status of colonist (lot owner): 1=single, 2=married.

Variable	Indices	COMMON	Type	Definition
MORTYP	LOT	COLON	INTEGER	Colonist type: 1=entrepreneur, 2=independent farmer, 3=artisan farmer, 4=laborer farmer.
NITRO	LOT, IPCH	SOIL	DOUBLE PRECISION	Nitrogen in the soil of the lot and patch (% dry weight).
PBEFF		BEFORE	DOUBLE PRECISION	Phosphorus of before field (ppm).
PCH		BUCHNG	DOUBLE PRECISION	Phosphorus change (ppm).
PH	LOT, IPCH	SOIL	DOUBLE PRECISION	pH of soil in lot and patch.
PHBEFF		BEFORE	DOUBLE PRECISION	pH of before field.
PHCH		BUCHNG	DOUBLE PRECISION	pH change.
PHOS	LOT, IPCH	SOIL	DOUBLE PRECISION	Phosphorus in soil of lot and patch (ppm).
PRES	product code	PROD	REAL	Kg of product present in lot. See codes section for products.
PROTPC		KMEAS	REAL	Protein per capita: computed carrying capacity measure (grams egg protein equivalent total protein/person/day).
RAIN	day of calendar year	WEACOM	REAL	Rainfall in mm on this day of the calendar year.
RAINAC	LOT, IPCH	UTCOM	REAL	Rain in mm that fell while the patch was in annual crops during the current year.
RAINBA	LOT, IPCH	UTCOM	REAL	Rain in mm that fell while the patch was bare during the current year.
RAINSU		WEATOT	REAL	Rain sum (sum of mm of rain between the dates used in query of WEABD).
RINSOL	day of calendar year	WEACOM	REAL	Insolation in hours on this day of the calendar year.

Variable	Indices	COMMON	Type	Definition
RINSSU		WEATOT	REAL	Insolation sum (sum of hours of insolation between the dates used in query of WEABD).
RNBEFF		BEFORE	DOUBLE PRECISION	Nitrogen of before field (% dry weight).
RNCH		BUCHNG	DOUBLE PRECISION	Nitrogen change (% dry weight).
SEEDCN		SEEDNE	REAL	Seed cash need (Cruzeiros of Jan. 1, 1975 needed for the purchase of seeds).
SEEDN		SEEDNE	REAL	Seed need (kg of seeds).
SEEDST	LOT, crop	PROD	REAL	Kg of seed stored for the lot, crop and year. Crops: 1=rice, 2=maize, 3=Phaseolus 4=Vigna.
SIZPCH		SIZES	REAL	Size of a patch in hectares.
SLOPE	LOT, IPCH	SOIL	DOUBLE PRECISION	Slope of the lot and patch (%).
SMEAT		GAME	REAL	Sale meat pool for community (kg of game available for sale from hunters to other members of the community) for the year.
STDRD	item, IYR	STAND	REAL	Standards value computed for output. See STANDARDS codes for items in codes section.
SUBNCH		FOOD	REAL	Subsistence need for cash: Cruzeiros of Jan. 1, 1975 needed to satisfy subsistence needs for the family for the year, including subsistence quantities of all products and cash requirement.
TECH	crop	TECHN	REAL	Technology effect (ie. genetic improvement Proportion of yield as calculated from bas experiment station yields at beginning of run (including cumulative effect of

Variable	Indices	COMMON	Type	Definition
				Crop codes: 1=rice, 2=maize, 3=Phaseolus, 4=Vigna, 5=bitter manioc, 6=sweet manioc, 7=cacao, 8=pepper, 9=pasture.
UBALCH		UBCHNG	DOUBLE PRECISION	Unburned aluminum change (the change in Al^{+++} in ME/100g resulting from processes other than burning for the patch in question).
UBNCH		UBCHNG	DOUBLE PRECISION	Unburned nitrogen change (the change in nitrogen resulting from processes other than burning for the patch in question). (% dry weight).
UBPCH		UBCHNG	DOUBLE PRECISION	Unburned phosphorus change (the change in phosphorus resulting from processes other than burning for the patch in question). (ppm).
UBPHCH		UBCHNG	DOUBLE PRECISION	Unburned pH change (the change in pH resulting from processes other than burning for the patch in question).
USEOUT	item, land use code	LUOUT	REAL	Land use output measures. In USECNT these are totals; they are converted to proportions in MAIN before being written as output. Items: 1=proportion of study area with land use harvested, 2=proportion of lots with land use harvested, 3=area-wide average yield for crop in patches harvested in kg/ha/year grown. Land use codes: first 12 codes of LUOUT land use codes (see codes section).

Variable	Indices	COMMON	Type	Definition
VIRGSO	LOT, IPCH	HISTOR		Virgin soil indicator (for indicating previous planting in Phaseolus for Rhizoctonia attack probability calculation 1=virgin (not prevously planted with Phaseolus), 2=previously planted with Phaseolus.
YLDBM		YIELDS	REAL	Yield of bitter manioc (kg farinha/ha/ 12 months growth) for patch last examined by BMYLD.
YLDCA		YIELDS	REAL	Yield of cacao (kg/ha/yr) for patch last examined by CAYLD.
YLDMZ		YIELDS	REAL	Yield of maize (kg/ha) for patch last examined by MZYLD.
YLDPA		YIELDS	REAL	Yield of pasture (kg beef live weight gain/ha/year) for patch last examined by PAYLD.
YLDPE		YIELDS	REAL	Yield of pepper (kg/ha/year) for patch last examined by PEYLD.
YLDPS		YIELDS	REAL	Yield of Phaseolus (kg/ha) for patch last examined by PSYLD.
YLDRI		YIELDS	REAL	Yield of rice (kg/ha) for patch last examined by RIYLD.
YLDSM		YIELDS	REAL	Yield of sweet manioc (kg/ha/12 months growth) for patch last examined by SMYLD.
YLDVI		YIELDS	REAL	Yield of Vigna (kg/ha) for patch last examined by VIYLD.

Variable	Indices	COMMON	Type	Definition
YRBUPR	product code	PRIC	REAL	Year buying price for the product (Cruzeiros of Jan. 1, 1975/kg). See codes section for product codes.
YRSEPR	product code	PRIC	REAL	Year selling price for the product (Cruzeiros of Jan. 1, 1975/kg for the year). See codes section for product codes.

EXOGENOUS VARIABLES IN INPUT DATA

Variable	Indices	COMMON	Type	Definition
AGBRME		POP	REAL	Age of bride mean: age in years of bride of a single colonist (lot owner) who marries.
AGBRSD		POP	REAL	Age of bride standard deviation: for age in years of the bride of a single colonist (lot owner) who marries.
ALLIME		FERT	REAL	Lime dose (kg/ha dolomitic lime) to be applied per unit (ME/100g) of aluminum (Al^{+++}) in the soil.
AMTPHA	loan type	LOANS	REAL	Amount financed per hectare in Cruzeiros of Jan. 1, 1975. Exception: for loan types 1, 5, 11, and 12 this is the amount of the loan. See codes section for loan types.
ANIPRO	product code	NUTRI	REAL	Animal protein content of the 17 items (products) in kg animal protein/kg product. See codes section for product codes.
ANPMIN		STAND	REAL	Animal protein minimum standard: grams animal protein per person per day minimum standard for carrying capacity comparisons.
BASEPY		PASTUR	REAL	Base pasture yield (yield in kg dry weight grass/ha/year of the variety used (here Panicum maximum) at 2.0 ppm soil phosphorus for the first year as pasture).

Variable	Indices	COMMON	Type	Definition
BPMULT		DISEA	REAL	Black pod disease multiplier: the proportion of the undiseased yield expected if cacao is attacked by black pod.
BTRCME		PRALCO	REAL	Mean cost of bank trips for sale of crops per harvest (Cruzeiros of Jan. 1, 1975).
BTRCSD		PRALCO	REAL	Bank trip cost standard deviation for sale of crops (Cruzeiros of Jan. 1, 1975/harvest).
BURNPR	burn type	BUPROB	REAL	Probability that a patch will be burned given that it is "cleared" and allocated by burn type. Burn types: 1=virgin, 2=second growth, 3=weed.
BUYME	product code	COSTS	REAL	Mean buying price of products (Cruzeiros of Jan. 1, 1975/kg). See codes section for product codes.
BUYSD	product code	COSTS	REAL	Standard deviation of buying price of products (Cruzeiros of Jan.1, 1975/kg). (between lots within a year).
CALAGE	calorie factor age class	POP	REAL	Calorie factor: a factor expressing the effect of calorie deprivation on excess mortality in populations by age class. Calorie factor age classes: 1=0 years (IAGE=1), 2=1 to 3 years (IAGE=2 to 4), 3=4 to 6 years (IAGE=5 to 7), 4=7 to 9 years (IAGE=8 to 10), 5=10 to 12 years (IAGE=11 to 13), 6=13 to 15 years (IAGE=14 to 16), 7=16 to 19 years (IAGE=17 to 20), 8= 20 or more years (IAGE=21-80

Variable	Indices	COMMON	Type	Definition
CALMIN		STAND	REAL	Calorie minimum standard: minimum average Kcal/person/day for carrying capacity comparisons.
CALOR	product code	NUTRI	REAL	Caloric content of products (Kcal/kg). For meats this is calculated using dressed weights. See codes section for product codes.
CALREQ	calorie requirement age class	POP	REAL	Calorie requirement (Kcal/person/day) by calorie requirement age class. Calorie requirement age classes for years 0 through 19 (IAGE=1 through 20) are 1 through 20. Years 20 to 39 (IAGE 21 to 40)= 21, Years 40 to 49 (IAGE 41 to 50)=22, Years 50 to 59 (IAGE 51 to 60)=23, Years 60 to 69 (IAGE 61 to 70)=24, Years 70 or over (IAGE 71 to 86)=25.
CAPME	Colonist type, original colonist status		REAL	Mean initial capital (CAPIT(LOT)) for colonists of this type and status. For newcomers this value is <u>after</u> payment of all settlement debts. Colonist types: see MORTYP, Original colonist status: see IORIG.
CAPSD	Colonist type, original colonist status		REAL	Standard deviation of initial capital (see CAPME).

Variable	Indices	COMMON	Type	Definition
CGCME	colonist type, original colonist status		REAL	Initial capital goods for consumption mean for colonists of this type and status. Colonist types: see MORTYP, Original colonist status codes: 1=original, 2=newcomer. (Cr1975$
CGCSD	Colonist type, original colonist status		REAL	Initial capital goods for consumption standard deviation. (see CGCME). (Cruzeiros of Jan. 1, 1975).
CGEME	Colonist type, original colonist status		REAL	Initial capital goods for enterprise mean for colonists of this type and status. (Cruzeiros of Jan. 1, 1975). Colonist types: see MORTYP, Original colonist status codes: 1=original, 2=newcomer.
CGESD	Colonist type, original colonist status		REAL	Initial capital goods for enterprises standard deviation. (cruzeiros of Jan. 1, 1975). See CGEME.
CGLME	Colonist type, original colonist status		REAL	Initial capital goods for lot (CGOODS(LOT)) mean for colonists of this type and status. (Cruzeiros of Jan. 1, 1975). Colonist types: see MORTYP. Original colonist status codes: 1=original, 2=newcomer.

Variable	Indices	COMMON	Type	Definition
CGLSD	colonist type, original colonist status		REAL	Initial capital goods for lot standard deviation for colonists of this type and status. (See CGLME). (Cruzeiros of Jan. 1, 1975).
CHICMZ		PRALCO	REAL	Chicken harvested from maize conversion factor: kg live weight chickens harvested/ kg maize feed.
CHPCMI		STAND	REAL	Cash per capita minimum standard (minimum cruzeiros of Jan. 1, 1975 per person per month for carrying capacity comparisons).
CHPFMI		STAND	REAL	Cash per family minimum standard (minimum cruzeiros of Jan. 1, 1975 per family per month for carrying capacity comparisons).
CLLMAX		STAND	REAL	Clearing of lot maximum standard (proportion). The maximum clearable for carrying capacity standard comparisons.
CLPROB	clearing class		REAL	Clearing probabilities by clearing class. Probabilities are probabilities of clearing some of this type given the existence of virgin land and land of this type. "Clearing" is preparation of land for crops other than pasture. Clearing class codes:

Variable	Indices	COMMON	Type	Definition
				1=weeds ($\leq$ 8 months old), 2=second growth less than 2 years old, 3=second growth 2-3 years old, 4=second growth 4-6 years old, 5=second growth 7-11 years old, 6=second growth 12-16 years old, 7=second growth 17-20 years old, 8= second growth over 20 years old, 9=virgin.
COLAB	calendar month	COSTS	REAL	Cost of labor by calendar month (Cruzeiros of Jan. 1, 1975/man-day).
CONMAX		WEEDS	REAL	Continuous maximum: maximum number of years a field can be in continuous cultivation before weeds make it impossible to plant a new crop without an intervening fallow period. "Continuous cultivation" includes annual crops, perennial crops, pasture, bare and weeds ($<$ 240 days). The intervening fallow will be at least to the "second growth" ($\geq$ 240 days) stage.
CONPHO		FERT	REAL	Constant term of phosphorus regression (soil phosphorus level from kg/ha P_2O_5 applied).
CONSLI		FERT	REAL	Constant term of lime regression for pH change.

Variable	Indices	COMMON	Type	Definition
CRECME		OUTSID	REAL	Cash received mean (mean cruzeiros of Jan. 1, 1975 received by a colonist given that he receives something from outside the area).
CRECSD		OUTSID	REAL	Cash received standard deviation (cash is in cruzeiros of Jan. 1, 1975 per year for those colonists that receive some income from outside of the area).
CSENME		OUTSID	REAL	Cash sent mean (Cruzeiros of Jan. 1, 1975 per year for those colonists that send cash to the outside in a given year).
CSENSD		OUTSID	REAL	Cash sent standard deviation (Cruzeiros of Jan. 1, 1975 for those colonists that send cash to the outside in a given year).
CWASTE		PRALLO	REAL	Chicken wasteage factor (kg dressed weight/kg live weight).
DALOME	disease	SICK	REAL	Days lost mean: mean number of work days lost per illness. Days are actual days, not man-day equivalents. Disease codes: 1=malaria, 2=trauma, 3=other.

Variable	Indices	COMMON	Type	Definition
DALOSD	disease	SICK	REAL	Standard deviation of days lost per illness. (see DALOME).
DEPREC			REAL	Depreciation rate for capital goods (proportion of value lost per year),
DOSECA	element, nutrient level, year class	FERT	REAL	Fertilizer doses (kg active ingredient/ha) for cacao. Elements: 1=Phosphorus, 2=potassium, 3=nitrogen, 4=manure. Soil nutrient levels: 1=low, 2=high. Year class: 1=1 year, 2=2 years, 3=3 or more years.
DOSEPE	element, nutrient level, year class	FERT	REAL	Fertilizer doses (kg active. ingredient/ha) for pepper. Elements: 1=phosphorus, 2=potassium, 3=nitrogen, 4=manure. Soil nutrient levels: 1=low, 2=high. Year classes: 1=1 year, 2=2 years, 3=3 years, 4=4 or more years.
EARNME	labor type	WAGELA	REAL	Mean earning return on investments in enterprises (Cruzeiros of Jan. 1, 1975 per year per cruzeiro of Jan. 1, 1975 invested) for labor type 2 (entrepreneur). For labor type 1 this is wage in cruzeiros of Jan. 1, 1975 per male man-day. For other labor types this is mean yearly earnings (cruzeiros of Jan. 1, 1975/year). Labor

Variable	Indices	COMMON	Type	Definition
				manioc, 6=sweet manioc, 7=cacao, 8=pepper, 9=calories, 10=total protein.
EYME	crop code		REAL	Expected yield mean (kg/ha/year): mean yield which colonists expect to obtain. Crop codes: 1=rice, 2=maize, 3=Phaseolus, 4=Vigna, 5=bitter manioc, 6=sweet manioc.
EYSD	crop code		REAL	Expected yield standard deviation (kg/hectare/year). See EYME.
FAMSTR	item, original colonist status	POP	REAL	Family structure parameters. Items: 1=owner age mean at arrival (years), 2=owner age standard deviation at arrival (years), 3=Probability of other dependents (other than wife) for married colonists, 4= probability of other dependents for single colonists, 5=probability has wife at arrival (includes common law marriages), 6=wife age mean at arrival (years), 7=wife age standard deviation at arrival (years), 8= probability other dependent is male, 9=mean number of other dependents at arrival, 10=standard deviation of number of other dependents at arrival. Original colonist status codes: 1= original, 2=newcomer.

Variable	Indices	COMMON	Type	Definition
FICOME		FICOST	REAL	Financing cost mean (Cruzeiros of Jan. 1, 1975):The mean cost to a colonist for trips to the bank and other expenses for obtaining financing.
FICOSD		FICOST	REAL	Financing cost standard deviation (Cruzeiros of Jan. 1, 1975). See FICOME.
FINLME		FICOST	REAL	Financing labor loss (days): mean days of labor lost by colonists in arranging for financing.
FINLSD		FICOST	REAL	Financing labor loss standard deviation (days). See FINLME.
FLEQUI	sex, labor age class	POP	REAL	Family labor equivalent (man-day equivalents) by sex and labor age class (proportion of adult male value of labor in agricultural work). Sexes: 1=male, 2=female. Labor age classes: 1=0-6 years, 2=7-8 years, 3=9-13 years, 4=14-17 years, 5=18 or more years.
FUMULT		DISEA	REAL	Fusarium disease multiplier: the proportion of the undiseased yield expected if pepper is attacked by Fusarium.
GWASTE		GAME	REAL	Proportion of game live weight wasted.

Variable	Indices	COMMON	Type	Definition
				3=Phascolus, 4=Vigna, 5=bitter manioc, 6=sweet manioc, 7= cacao, 8=pepper, 9=pasture with cattle.
INIT		RANDOM	INTEGER	Initial seed for random number generator. Can be 0 for automatic random number generation according to time of day (in MTS), or a large odd number for a repeatable pseudo-random number.
IPERIO	loan type	LOANS	INTEGER	Period of loans in years. See codes section for loan types.
ISTOCH		DETERM	INTEGER	Run type indicator. 1=deterministic, 2=stochastic.
IYRTPT		TRANSP	INTEGER	Year beginning time period two for transportation availability probabilities (years from beginning of simulation).
LEARNS			INTEGER	Subsistence learning codes for colonists learning to adjust land allocations to past yield history. 1=learning 2=no learning.
LSPORE	disease	DISEA	INTEGER	Life of spores in soil or alternate hosts for crop diseases (years). Disease codes: 1=Fusarium, 2=witches' broom, 3=black pod.

Variable	Indices	COMMON	Type	Definition
LOTS		SIZES	INTEGER	Number of lots in the simulation
MAXNLO		FIN	INTEGER	Maximum number of loans of different types allowed per colonist.
MONCOR	loan type	LOANS	INTEGER	Monitary correction code: whether or not the terms of the loan type include inflation correction. 1=no, 2=yes. See codes section for loan types
NOPCHS		SIZES	INTEGER	Number of patches per lot in the simulation.
PACHIP		PASTUR	REAL	Pasture constant at high phosphorus: constant term for plateau phase (over 10 ppm phosphorus) of dry weight pasture yield relation with soil phosphorus. See Fearnside 1978, Chapter 4).
PACOEF		PASTUR	REAL	Pasture coefficient: coefficient of regression of pasture dry weight yields on soil phosphorus. (See Fearnside 1978, Chapter 4).
PACONS		PASTUR	REAL	Pasture constant: constant term from regression of dry weight pasture yield on soil phosphorus (For soil phosphorus levels below 10 ppm). See Fearnside 1978, Chapter 4.
PBIRTH	age	POP	REAL	Probability per year that a woman will give birth (age-specific for ages 1-44 years).

Variable	Indices	COMMON	Type	Definition
PCAGPE		USEPR	REAL	Probability of cacao given pepper: the probability that a colonist who has specialized on pepper as a perennial crop will plant cacao.
PCINT1	loan type	LOANS	REAL	Percent interest at first level (without late payment penalty). See codes section for loan type
PCINT2	loan type	LOANS	REAL	Percent interest at second level (with late payment penalt See codes section for loan type
PCRECD		OUTSID	REAL	Probability cash received from outside (probability per colonist-year that any cash is received).
PCSENT		OUTSID	REAL	Probability that cash is sent to the outside (probability per colonist year).
PDEATH	sex, age	POP	REAL	Probability of death per year under adequate nutrition (sex and age specific). Sexes: 1= male, 2=female. Age=86 demographic age classes (IAGE) starting with 1 for 0-12 months.
PDEP	age, original colonist status	POP	REAL	Probability of a dependent (other than the lot-owner's wife) falling into each of the 86 demographic age classes, given that the colonist has a dependent. Age=IAGE (see PDEATH) Original colonist status: 1=original, 2=newcomer.

Variable	Indices	COMMON	Type	Definition
PDISEA	disease, sex, disease age class	SICK	REAL	Probability per year that an individual of the given sex and disease age class will get the disease. Diseases: 1=malaria, 2=trauma, 3=other. Sexes: 1=male, 2=female. Disease age classes: 1=0-4 years 2=5-9 years, 3=10-14 years, 4=15-19 years, 5=20-24 years, 6=25-29 years, 7=30-34 years, 8=35-39 years, 9=40-44 years, 10=45-49 years, 11=50-54 years, 12=55-59 years, 13=60 or more years.
PDISMO	disease, calendar month	SICK	REAL	Probability of disease per month: probability that, given a person gets a disease at some time during the year, it will be in the specified calendar month. Diseases: 1=malaria, 2=trauma, 3=other.
PFERT	perennial crop code	FERT	REAL	Probability of fertilization for a given perennial crop and year for a lot. Decision made only once for a given lot, crop, and year: the colonist either fertilizes all of his area in a given perennial crop or none in any given year. Perennial crop codes: 1=cacao, 2=pepper.

Variable	Indices	COMMON	Type	Definition
PLU	strategy code, single crop code	USEPR	REAL	Probability of cash crop land use for each cash crop (examine patchwise). PLU= cash crop hectare-years for crop X and strategy Y / total cash crop hectare-years for strategy Y. Strategy codes: 1=annual cash crops, 2=perennial crops, 3=ranching, 4=outside labor. Single crop codes: 1=rice, 2=maize, 3=Phaseolus, 4=Vigna, 5=bitter manioc, 6=sweet manioc 7=cacao, 8=pepper, 9=pasture without animals, 10=pasture with animals.
PMARRY		POP	REAL	Probability per year that a single colonist (lot owner) marries.
PMIMIG		POP	REAL	Probability that an individual immigrant received by a lot is a male.
PPEGCA		USEPR	REAL	Probability of pepper given cacao specialization: probability that a colonist who has specialized on cacao as a perennial crop will plant pepper
PPLPAY		PRALCO	REAL	Probability of private loan payment given subsistence need is satisfied. (Probability per year).

Variable	Indices	COMMON	Type	Definition
PRBM		INTERP	REAL	Probability of bitter manioc (alone or with crops other than rice or maize): probability per patch that, given that bitter manioc is planted, it is planted in this combination. Note: PRBM, PRBMMZ, and PRBMRI do not sum to 1 as the remainder is the probability of bitter manioc being interplanted with both rice and maize.
PRBMMZ		INTERP	REAL	Probability of bitter manioc interplanted with maize. Note: probability of bitter manioc interplanted with both rice and maize is not included.
PRBMRI		INTERP	REAL	Probability of bitter manioc interplanted with rice. (See PRBM).
PRCG	cash category, colonist type	CASHPR	REAL	Proportion to capital goods: proportion of that investment capital which has been designated for the category going to the purchase of capital goods. Cash categories: 1=lot, 2=enterprise, 3=consumption. Colonist types: 1=entrepreneur, 2=independent farmer, 3=artisan farmer, 4=laborer farmer.

Variable	Indices	COMMON	Type	Definition
PRDIES	disease	DISEA	REAL	Probability that crop dies given that it has the disease (probability per year). Diseases: 1=Fusarium, 2=witches' broom, 3=black pod.
PRFIN	loan type	FPROBS	REAL	Probability of financing being requested and picked up at the bank given that a colonist has decided to use the crop in question as a cash crop and that the colonist is solvent. See codes section for loan types.
PRFINL	calendar month	FICOST	REAL	Proportion of financing labor loss falling in each calendar month. (Financing labor loss is the days colonist loses in trips to government offices and the bank in arranging for financing).
PRI		INTERP	REAL	Probability of rice alone: probability that given rice is planted that it will be planted either alone or with crops other than maize and/or manioc.
PRIBM		INTERP	REAL	Probability of rice interplanted with bitter manioc.
PRICFE	fertil-izer	FERT	REAL	Price of fertilizer (Cruzeiros of Jan. 1, 1975/kg active ingredient. Fertilizers:

Variable	Indices	COMMON	Type	Definition
				1=lime 2=P_2O_5, 3=K, 4=N, 5=manure.
PINDEM	sex, age	POP	REAL	Probability per year of a given individual emmigrating by sex and age class. Sexes: 1=male, 2=female. Age classes are the 86 demographic age classes (starting with 1 for less than 1 year old).
PRIMAG	sex, age	POP	REAL	Probability that an individual immigrant received by a lot belongs to each age class given his sex. Sexes: 1=male, 2=female. Age classes are the 86 demographic age classes.
PRIMZ		INTERP	REAL	Probability of rice interplanted with maize (only).
PRIMZB		INTERP	REAL	Probability of rice interplanted with maize and bitter manioc.
PRIMZS		INTERP	REAL	Probability of rice interplanted with maize and sweet manioc.
PRINME	colonist type		REAL	Proportion invested mean: the proportion of free capital invested after satisfying subsistence needs by colonist type. "Free capital" is defined as cash after paying debts; "subsistence needs" are defined as cash spent on subsistence crops + cash spent on canned meat and game. Other cash needs (included in SUCASH) are not

Variable	Indices	COMMON	Type	Definition
				included; these are met from consumption cash after the allocation to investiment.
PRINSD	colonist type		REAL	Proportion of invested standard deviation: proportion of capital invested after satisfying subsistence needs by colonist type. See PRINME for definitions.
PRIPA		INTERP	REAL	Probability of rice interplanted with pasture (either rice + pasture or rice + pasture + other crops.).
PRISM		INTERP	REAL	Probability of rice interplanted with sweet manioc.
PRNOTR	zone, time period	TRANSP	REAL	Probability of no transport to market being available at harvest time. Zones: 1=roadside, 2=travessões before interior agrovila (10 km from roadside), 3=travessões after interior agrovila (10-20 km from roadside). Time periods: 1=first 3 years, 2=later years.
PROAGE	protein factor age class	POP	REAL	Protein factor: value expressing the effect of protein deficiency on excess mortality in populations for 19 age classes. Protein factor age classes: same as "IAGE" (demographic age class) through age class 18; class 19 lumps all older ages.

Variable	Indices	COMMON	Type	Definition
PROB	pH class after move, pH class before move, distance moved category	MATRIX	REAL	Transition probabilities for initial soil pH values. pH classes: 1= under 4.0, 2= 4.0-4.4, 3=4.5-4.9, 4=5.0-5.4, 5=5.5-5.9, 6=6.0-6.4,7=6.5 and over. Distance moved categories: 1=100 m. 2=500 m.
PROMIN		STAND	REAL	Protein minimum standard: grams egg protein equivalent of total protein for carrying capacity standards. (per capita per day).
PROPTY	colonist type, original colonist status		REAL	Proportion of colonist types among original and newcomer colonist populations. Colonist types: 1=entrepreneur, 2=independent farmer, 3=artisan farmer, 4=laborer farmer. Original colonist status: 1=original, 2=newcomer.
PROREQ	Protein requirement age class	POP	REAL	Protein requirement (total protein requirement in grams egg protein equivalent/person/ day) by protein requirement age class. Protein requirement age classes: 1=0 years (IAGE=1), 2=1-3 years (IAGE=2-4), 3=4-6 years (IAGE=5-7), 4=7-9 years (IAGE=8-10), 5=10-12 years (IAGE=11-13), 6=13-15 years

Variable	Indices	COMMON	Type	Definition
				(IAGE=14-16), 7=16-19 years (IAGE=17-20), 8=20 or more years (IAGE=21-86).
PRPS		INTERP	REAL	Probabability of Phaseolus (probability planted alone as opposed to with green maize; dry maize is not counted).
PRSM		INTERP	REAL	Probability of sweet manioc planted alone or with other than maize and/or rice. Note: PRSM, PRSMRI, and PRSMMZ do not sum to 1; the remainder represents the probability of sweet manioc with both rice and maize.
PRSMMZ		INTERP	REAL	Probability of sweet manioc interplanted with maize.
PRSMRI		INTERP	REAL	Probability of sweet manioc interplanted with rice. (See note under PRSM).
PRVI		INTERP	REAL	Probability of Vigna planted alone (as opposed to with maize (green or dry) or with other crops).
PRVOLP		PRALCO	REAL	Probability of voluntary payment of bank, given subsistence cash need is satisfied and given some money is available after satisfying subsistence need.
PRZONE	zone	TRANSP	REAL	Proportion of lots in each zone. Zones: 1=roadside, 2=travessão before interior agrovila (10 km from roadside), 3=travessão

Variable	Indices	COMMON	Type	Definition
				after interior agrovila (10-20 km from roadside).
PSELLB	crop	PRALCO	REAL	Probability of selling each product to the Bank of Brasil (including "involuntary" sales). Both financed and unfinanced colonists are included. Products are first 10 codes of product codes (see codes section). Codes 9 and 10 are unused.
PTYLAB	labor type, colonist type	WAGELA	REAL	Probability of engaging in each labor type by colonist type. Labor types: 1=daily wage, 2=enterprise, 3=government or profession, 4=working women or children. Colonist types: 1=entrepreneur, 2=independent farmer, 3=artisan farmer, 4=laborer farmer.
RAINFL		FIN	REAL	Rate of inflation (as a proportion of increase). (Annual rate).
REQTL	calendar month, operation	REQUIR	REAL	Total labor requirement (regardless of sex or age) in man-day equivalents per hectare. Operation: 1=virgin clearing, 2=second growth clearing, 3= weed clearing, 4=rice "custeio" (planting, weeding, harvesting), 5=maize "custeio", 6=beans (either Phaseolus or Vigna)

Variable	Indices	COMMON	Type	Definition
				"custeio", 7=manioc (either sweet or bitter) "custeio", 8=cacao planting, 9=pepper planting, 10=pasture without animals planting, 11=pasture with animals planting, 12=cacao maintenance, 13=pepper maintenance, 14=pasture without animals maintenance, 15=pasture with animals maintenance.
REQML	calendar month, operation	REQUIR	REAL	Requirement for male labor (man-days/ha). See REQTL for operation codes.
REQFC	calendar month, operation	REQUIR	REAL	Fixed cost requirement (Cruzeiros of Jan. 1, 1975/ha), exclusive of fertilizer for maintenance (as opposed to planting) operations, and exclusive of sacks (which are deducted from SELLME). See REQTL for operation codes.
RMLAME	labor type	WAGELA	REAL	Male labor mean (man-days/lot/year) spent in each labor type given that the colonist engages in this labor type. Labor types: 1=daily wage, 2=enterprise, 3=government or profession, 4=working women or children.
RMLASD	labor type	WAGELA	REAL	Standard deviation of male labor (man-days/lot/year) spent in each labor type given that the colonist engages in this labor type. (See RMLAME).

Variable	Indices	COMMON	Type	Definition
SEED	crop	PROD	REAL	Seed planting requirement (kg/ha) Crops: 1=rice, 2=maize, 3= Phascolus, 4=Vigna.
SELLME	product	COSTS	REAL	Mean selling prices for products (Cruzeiros of Jan. 1, 1975/kg). Prices are adjusted to include the cost of sacks. See codes section for product codes.
SELLSD	product	COSTS	REAL	Standard deviation of selling prices for products (Cruzeiros of Jan. 1, 1975/kg). See SELLME.
SIZLOT		SIZES	REAL	Size of a lot in hectares.
SLOLI		FERT	REAL	Slope of the lime regression for pH change. See Fearnside 1978, Appendix E.
SLOPHO		FERT	REAL	Slope of the phosphorus regression (Soil phosphorus change from kg/ha P_2O_5 applied). See Fearnside 1978, Appendix E.
SMTYPR		MISC	REAL	Sweet manioc type probability: probability that a colonist will plant sweet as opposed to bitter manioc in a given year, given that he plants manioc.
SPOIME	product	SPOIL	REAL	Mean spoilage (between harvest and use) for products kept for consumption or market (not seed). (Proportion). See codes section for product codes; only first 8 products used.

Variable	Indices	COMMON	Type	Definition
SPOISD	product	SPOIL	REAL	Spoilage standard deviation for products kept for market or consumption (not seeds). See SPOIME.
SPOSME	product	SPOIL	REAL	Mean spoilage of seeds (proportion spoiled before use) for products stored for use as seeds. See codes section for product codes.
SPOSSD	product	SPOIL	REAL	Spoilage proportion of seeds standard deviation. See SPOSME.
START	crop	TECHN	REAL	Starting value for yield (kg/ha) for crops (fertilized yield or maximum expected yields for present varieties in area). Used as base for technological improvement (YRLYIM). Crops: 1=rice, 2=maize, 3=Phascolus, 4=Vigna, 5=bitter manioc, 6=sweet manioc, 7=cacao, 8=pepper, 9=pasture with animals.
SUCASH		NEED	REAL	Subsistence cash need (Cruzeiros of Jan. 1, 1975/person/year). This is for items other than subsistence crops; not to be confused with SUBNCH. Cash paid for canned meat and game is also not included in SUCASH.

Variable	Indices	COMMON	Type	Definition
SUKGBE		NEED	REAL	Subsistence need for beans (either Phascolus or Vigna) (kg/person/year).
SUKGMN		NEED	REAL	Subsistence need for manioc (either bitter or sweet) (kg farinha/person/year).
SUKGMT		NEED	REAL	Subsistence need for meat (kg dressed weight/person/year) (Any kind of meat, fresh or canned).
SUKGMZ		NEED	REAL	Subsistence need for maize (kg/person/year). Includes maize fed to chickens.
SUKGRI		NEED	REAL	Subsistence need for rice (kg/person/year) (with husks).
TDNPDM		PASTUR	REAL	Total digestible nutrients as proportion of dry matter (for pasture grass).
TOLAME	labor type	WAGELA	REAL	Mean total labor (man-days/lot/year) spent in each labor type given that a colonist engages in that labor type. Labor types: 1=daily wage, 2=enterprise, 3=government or profession, 4=working women and children.
TOLASD	labor type	WAGELA	REAL	Standard deviation of total labor (man-days/lot/year) spent in each labor type given that the colonist engages in that labor type. See TOLAME.

Variable	Indices	COMMON	Type	Definition
TOTPRO	item	NUTRI	REAL	Total protein content of the 17 items (products) in kg egg protein equivalent/kg product. See codes section for product codes.
TRANME		PRALCO	REAL	Mean transportation cost (Cruzeiros of Jan. 1, 1975/kg) to market.
TRANSD		PRALCO	REAL	Transportation cost standard deviation. (Cruzeiros of Jan. 1, 1975/kg). See TRANME.
TUBCAL		TUBERS	REAL	Tuber calories: thousand Calories per capita per year supplied from eating tubers.
TUBTP		TUBERS	REAL	Tubers total protein: grams total protein per capita per year supplied from eating tubers.
UNMODP	land use pattern, colonist type		REAL	Unmodified probabilities of each of 4 land use patterns being adopted by colonists of the 4 colonist types. Land use patterns: 1=annual cash crops, 2=perennial cash crops, 3=ranching, 4=outside labor. Colonist types: 1=entrepreneur, 2=independent farmer, 3=artisan farmer, 4=laborer farmer.
VITYPR		MISC	REAL	Vigna type probability: the probability that a colonist will plant Vigna rather than Phaseolus in a given year, given that he plants one of the two.

Variable	Indices	COMMON	Type	Definition
WBMULT		DISEA	REAL	Witches'broom multiplier: the proportion of the undiseased yield expected if cacao is attacked by witches' broom dis
WGPTDN		PASTUR	REAL	Weight gain as proportion of total digestible nutrients: relates cattle growth to pastu grass consumed.
YLDINT		GAME	REAL	Game yield decline intercept (kg/man-day hunting effort); The game yield obtained at the beginning of the colonization period.
YLDSLO		GAME	REAL	Game yield decline slope (kg/ man-day hunting effort).
YREFF	year	PASTUR	REAL	Year effect: reduction in yields of pasture dry weight caused by invasion of weeds. Expressed as a proportion of the first year yield. The index "year" refers to years of pasture growth.
YRLYIM	crop		REAL	Yearly amount of technological improvement in yields of crops (kg/ha increase/year). Crop codes: 1=rice, 2=maize, 3= Phaseolus, 4=Vigna, 5=bitter manioc, 6=sweet manioc, 7= cacao, 8=pepper, 9=pasture with animals.

Variable	Indices	COMMON	Type	Definition
ZCRISK		NEED	REAL	z statistic of acceptable colonist risk of subsistence crop failure (of any particular crop failing: probability per year).

EXOGENOUS VARIABLES IMPLICIT IN PROGRAM

Variable	Indices	COMMON	Type	Subprogram	Definition
cacao life expectancy			INTEGER	CAYLD	Expected life span of cacao trees in days.
CACRPH			REAL	CAYLD	Cacao critical pH: pH value above which further increase do not increase cacao yields
CAYREF			REAL	CAYLD	Cacao year effect: proportio of mature tree yield expecte in each year class. Year classes: 1=1 year, 2=2 years 3=3 years, 4=4 years, 5=5 or more years.
PECRC			REAL	PEYLD	Pepper critical carbon: the carbon level (% dry weight) above which no yield response occurs.
PECRP			REAL	PEYLD	Pepper critical phosphorus: the phosphorus level (ppm) above which no yield response occurs.
PECRPH			REAL	PEYLD	Pepper critical pH: the pH value above which no further yield response occurs.
pepper life expectancy			INTEGER	PEYLD	Expected life span of pepper plants in days.
PEYREF			REAL	PEYLD	Pepper year effect: proporti of mature plant yield obtaine by plants in each year class. Year classes: 1=1 year,

Variable	Indices	COMMON	Type	Subprogram	Definition
					2=2 years, 3=3 years, 4=4 or more years.
SDEVAP	calendar month	MOWEA	REAL	BLOCK DATA	Standard deviation of evaporation (mm/month) for each calendar month.
SDINSO	calendar month	MOWEA	REAL	BLOCK DATA	Standard deviation of insolation (hours/month) for each calendar month.
SDRAIN	calendar month	MOWEA	REAL	BLOCK DATA	Standard deviation of rainfall (mm/month) for each calendar month.

CODES

Name	Use	Code.	Meaning
Cash categories	subroutines	1	lot (agricultural development)
	STRAT and	2	enterprise (shops, etc.)
	CASHAL	3	consumption
Clearing classes	"AVAIL" in	0	unavailable (planted)
	subroutine	1	weeds or bare (less than 8 months)
	ICLEAR	2	second growth 8 months-2 years (730 days)
		3	second growth 2 - 3 years, including third year (730 - 1096 days)
		4	second growth 4 - 6 years inclusive (1096 - 2192 days)
		5	second growth 7 - 11 years inclusive (2192 - 4018 days)
		6	second growth 12 - 16 years inclusiv (4018 - 5844 days)
		7	second growth 17 - 20 years inclusiv (5844 - 7305 days)
		8	second growth over 20 years (7305 days).
		9	virgin forest.
Colonist types		1	entrepreneur
		2	independent farmer
		3	artisan farmer
		4	laborer farmer
Crop call code	"ICRCAL"	1	rice
	codes	2	rice + maize
		3	maize
		4	maize + rice

Name	Use	Code	Meaning
(crop call codes continued)		5	maize + manioc (sweet or bitter)
		6	maize + other interplanted crop
		7	Phaseolus
		8	Phaseolus + maize
		9	Vigna
		10	bitter manioc
		11	sweet manioc
Crop codes for TECHNO	subroutine TECHNO	1	rice
		2	maize
		3	Phaseolus
		4	Vigna
		5	bitter manioc
		6	sweet manioc
		7	cacao
		8	pepper
		9	pasture with animals
Crop disease codes	subroutine CDISEA and MAIN	1	Fusarium (black pepper disease)
		2	witches' broom (cacao disease)
		3	black pod (cacao disease)
Element codes	subroutine MAINT and MAIN	1	phosphorus
		2	pH
		3	aluminum (Al^{+++})
		4	nitrogen
		5	carbon
Establishment codes (for crop diseases)	CDISEA	1	not established in area
		2	established in area
Family structure codes	subroutine POPGEN	1	owner age mean
		2	owner age standard deviation
		3	probability colonist has other dependents (other than wife) for married colonists.

Name	Use	Code	Meaning
(Family structure codes continued)		4	probability colonist has other dependents (other than wife) for single colonists.
		5	probability colonist (lot owner) has wife (including common law marriage).
		6	wife age mean
		7	wife age standard deviation
		8	probability that other dependent (other than wife) is male
		9	number of other dependents (other than wife) mean
		10	number of other dependents (other than wife) standard deviation
Land use codes		1	virgin forest
		2	bare (<2 months since cultivation)
		3	weeds (< 8 months old)
		4	second growth ("capoeira")(≥ 8 mont old)
		5	rice
		6	rice + maize
		7	maize
		8	Phaseolus
		9	green maize + Phaseolus
		10	Vigna
		11	maize (green or dry) + Vigna
		12	bitter manioc
		13	rice + bitter manioc
		14	maize + bitter manioc

Name	Use	Code	Meaning
(land use codes continued)		15	rice + maize + bitter manioc
		16	sweet manioc
		17	rice + maize + sweet manioc
		18	pasture without animals
		19	rice + pasture
		20	cacao
		21	pepper
		22	rice + sweet manioc
		23	pasture with animals
		24	maize + sweet manioc
Land use at maximum rainfall	LUMAXR	1	virgin forest
		2	annual crops or bare (< 2 months)
		3	pepper
		4	cacao
		5	pasture (with or without animals)
		6	weeds (2-8 months)
		7	second growth ("capoeira") (over 8 months).
Land use: "USEPR codes"	for "AREA" in land use allocation	1	rice
		2	maize
		3	Phaseolus
		4	Vigna
		5	bitter manioc
		6	sweet manioc
		7	cacao
		8	pepper
		9	pasture without animals
		10	pasture with animals
Land use: "UTCOM codes"	"item codes" "LU", and "LASTUS" in subroutine USETOT	1	no category
		2	bare (< 2 monbhs)
		3	annual crops
		4	perennial crops
		5	pasture (with or without animals)
		6	fallow (weed or [illegible] month)

Name	Use	Code	Meaning
Loan types	subroutine BANK	1	land and house
		2	virgin felling - type 1 (8 year ter
		3	virgin felling - type 2 (1 year ter
		4	INCRA debt (salaries, etc.)
		5	other (power saws, etc.)
		6	seeds (INCRA)
		7	rice "custeio" (including cutting second growth).
		8	maize "custeio"
		9	Phaseolus "custeio"
		10	perennial crops
		11	cattle and pasture
		12	private loans
"LUOUT" land use codes		1	rice alone
		2	rice interplanted
		3	maize alone
		4	maize interplanted
		5	Phaseolus
		6	Vigna
		7	bitter manioc
		8	sweet manioc
		9	cacao
		10	pepper
		11	pasture with animals
		12	second growth
operation codes	LABOR function	1	virgin clearing
		2	second growth clearing
		3	weed clearing
		4	rice

Name	Use	Code	Meaning
(operation codes continued)		5	maize
		6	Phaseolus or Vigna ("beans")
		7	manioc (sweet or bitter)
		8	cacao establishment
		9	pepper establishment
		10	pasture without animals establishme
		11	pasture with animals establishment
	following codes in subroutine MAINT only		
		12	cacao maintenance
		13	pepper maintenance
		14	pasture without animals maintenance
		15	pasture with animals maintenance
Outside labor Patterns	subroutines WAGE and STRAT	0	none
		1	daily wage
		2	enterprise (stores, etc.)
		3	government or other profession (drivers, etc.)
		4	earning women or children
		5	patterns 1 + 4
		6	patterns 2 + 4
		7	patterns 3 + 4
Outside labor Types	subroutines WAGE and STRAT	0	none
		1	daily wage
		2	enterprise (stores,etc.)
		3	government or other profession (drivers, etc.)
		4	earning women or children
Perennial crop codes	subroutine MAINT and MAIN	1	cacao
		2	pepper

Name	Use	Code	Meaning
Product codes	"costs" codes for products	1	rice (with husks)
		2	maize (removed from cobs)
		3	Phaseolus
		4	Vigna
		5	bitter manioc (farinha)
		6	sweet manioc (farinha)
		7	cacao
		8	pepper
		9	calories
		10	total protein
		11	animal protein
		12	cattle
		13	chickens
		14	game
		15	pigs
		16	pork
		17	canned meat

Name	Use	Code	Meaning
Standards	"STDRD" items in subroutine MEASUR	1	calories per capita (Fraction of lots below standard)
		2	total protein per capita (Fraction of lots below standard)
		3	animal protein per capita (Fraction of lots below standard)
		4	cash standard of living per capita (fraction of lots below standard)
		5	cash standard of living per family (fraction of lots below standard)
		6	cleared proportion of lot (Fraction of lots over standard)
		7	cleared proportion of area (Fraction of total area)
		8	area-wide average calories per capita (Kcal/person/day)
		9	area-wide averate total protein per capita (g/person/day)
		10	area-wide average animal protein per capita (g/person/day)
		11	area-wide average cash standard of living per capita (Cruzeiros of Jan. 1, 1975/person/month)
		12	area-wide average cash standard of living per family (proportion of minimum wage)
		13	population (persons/km^2)
		14	proportion of original colonists remaining.

Name	Use	Code	Meaning
Strategy codes	"LUPAT" in subroutine STRAT	1	annual cash crops
		2	perennial cash crops
		3	ranching
		4	outside labor
"USEPR" codes			see Land use: "USEPR" codes
"UTCOM" codes			see Land use: "UTCOM" codes

MTS SYSTEM SUBROUTINES

ERROR

use: CALL ERROR

function: returns contol to MTS, prints the comment "ERROR RETURN".

GRAND, GRAND1

use: CALL GRAND1(init)
x = GRAND(sd, amean)

parameters:

init	initial integer value for generating random numbers (location of value)
sd	real (REAL*4) value of standard deviation
amean	real (REAL*4) value of mean

function: returns a normally distributed random number

note: this is only used in the BRAND function

PLOT1

use: CALL PLOT1(nscale(1), nhl, nshh, nvl, nsbv, rc4)

parameters:

nscale	five integers specifying scaling and number of decimal places to be printed (location of region)
nhl	integer number of horizontal lines
nshh	integer number of spaces between horizontal lines
nvl	integer number of vertical lines
nsbv	integer number of spaces between vertical lines
rc4	statement label for an error return

function: sets up information required to construct a plot.

note: this is only used in the OUTPUT subroutine of KPROG2, and in the separate output plotting routines.

PLOT2

use: CALL PLOT2(image, xmax, xmin, ymax, ymin, rc4, rc8)

parameters:

image	value of 0; holds space for image of graph (location).
xmax	largest X value to be plotted
xmin	smallest X value to be plotted
ymax	largest Y value to be plotted
ymin	smallest Y value to be plotted
rc4	statement label for error return
rc8	statement label for error return

function: sets up grid and point plotting information

note: this is used only in the OUTPUT subroutine of KPROG2, and in the separate output plotting subroutines.

PLOT3

use: CALL PLOT3(bcd, x, y, ndata, int, rc4, rc8, rc12, rc16)

parameters:

bcd	plotting character
x	x values (REAL)
y	y values (REAL)
ndata	number of points to be plotted (INTEGER)
int	4 (number of bytes to be plotted)
rc4, rc8, rc12, rc16	statement label for error returns

function: places the plotting characters for each point

note: this is only used in the OUTPUT subroutine of KPROG2, and in the separate output plotting routines.

PLOT4

use: CALL PLOT4(nchar, label, rc4, rc8, rc12, rc16, rc20, rc24, rc28)

parameters:

nchar	number of characters in vertical label
label	the label
rc4, rc8, rc12, rc16, rc20, rc24, rc28	statement labels for error returns

function: prints graph and axis labels

note: this is only used in the OUTPUT subroutine of KPROG2, and in the separate output plotting routines.

REWIND

use: CALL REWIND(arg)

parameter: arg integer corresponding to input/output unit number to be rewound

function: rewinds logical input/output units: rewinds if the unit is a tape or resets pointers so that next reference is to the beginning of the file in the case of a disc file.

SYSTEM

use: CALL SYSTEM

function: terminates execution successfully, printing the comment "EXECUTION TERMINATED".

URAND

use: x = URAND(init)

parameter: init initial integer value for generating random numbers (location of value).

function: returns a uniformly distributed random number between 0 and 1.0. If the value of the parameter "init" is 0 then a non-repeatable number is automatically generated depending on the time of day. If the value of "init" is an odd number between 1 and 2147483647, then a repeatable pseudo-random number is generated.

note: this is only used in the ARAND function of KPROG2.

FULLER DESCRIPTIONS OF SYSTEM SUBROUTINES ARE AVAILABLE IN MTS VOLUME 3 (University of Michigan Computing Center, 1976).

ALLOC

Purpose:	allocation of cash crops and interplanting decisions
Kind of routine:	subroutine
Arguments:	LOT lot number
	IPCH patch number
	LUCOD land use code for single crop
COMMON areas:	BUPROB, BURNS, DETERM, INTERP, RANDOM, USECOM, VIRGCL
Routines called:	VBQ, SGRQ, ARAND
Routine called by:	LUALLO
Program size:	3908 bytes

* See routine MAIN for KPROG2 main program.

```
      SUBROUTINE ALLOC(LOT, IPCH, LUCOD)
C     ALLOCATION OF PATCHES AND INTERPLANTING DECISIONS
      INTEGER SUTYP, BDQUAL
      DIMENSION PR(7)
      COMMON/RANDOM/ INIT
      COMMON/USECOM/ LUSE(10,100),IDUR(10,100), LASTUS(10,100),
     1 CONTIN(10,100)
      COMMON/SIZES/ LOTS, NOPCHS, SIZLOT, SIZPCH
      COMMON/COLOUR/ LUPAT(10), CAPIT(10), CGOODS(10), AREAGL(10),
     1 FAMLAB(10), SALES(10), FAMSIZ(10), CBUENS(10), CAPCON(10),
     2 MORTYP(10), IORIG(10), CGOCON(10), CAPENI(10)
      COMMON/ISTLAP/PRI, PRISZ, PRISB, PRISS, PRISZS,
     1 PRIPA,PRPS, PRPI, PRPM, PRSMAI, PRBMAZ,
     1 PRSM, PRSMM1, PRSMM2, PRISZB
      COMMON/DETERM/ ISTUCK
      COMMON/DIRRS/ SUTYP(10,100), BDQUAL(10,100)
      COMMON/SUPROB/ BURNPR(3)
      EXTERNAL ARAND
      IF (LUCOD .EQ. 5) GO TO 201
C     NOTE: LUCOD IS LAND USE CODE FOR A SINGLE CROP
      IF (LUCOD .EQ. 7) GO TO 202
      IF (LUCOD .EQ. 8) GO TO 203
      IF (LUCOD .EQ.10) GO TO 204
      IF (LUCOD .EQ.12) GO TO 205
      IF (LUCOD .EQ.16) GO TO 206
      IF (LUCOD .EQ.20) GO TO 207
      IF (LUCOD .EQ.21) GO TO 208
      IF (LUCOD .EQ.15) GO TO 209
      IF (LUCOD .EQ.23) GO TO 210
      WRITE (6, 1000) LUCOD
 1000 FORMAT(1X, 'ERROR: LAND USE CODE', I5, 2X, 'NOT RECOGNIZED IN ALLO
     1C')
      CALL SYSTEM
  201 CONTINUE
C     RICE ALLOCATION INTERPLANTING DECISIONS
      RMODE = -1.
      IF (ISTUCK .EQ. 2) GO TO 103
C     CALCULATION OF MODE FOR DETERMINISTIC RUN
      PR(1) = PRI
      PR(2) = PRISZ
      PR(3) = PRISB
      PR(4) = PRISZB
      PR(5) = PRISS
      PR(6) = PRISZS
      PR(7) = PRIPA
      XMAX = 0.
      IMAX = 0
      DO 100 I=1,7
      IF (XMAX .LE. PR(I)) GO TO 101
      GO TO 100
  101 XMAX = PR(I)
      IMAX = I
  100 CONTINUE
      RMODE = 0.
      DO 102 IJ = 1, IMAX
      RMODE = RMODE + PR(IJ)
  102 CONTINUE
      RMODE = RMODE - 0.0001
  103 CONTINUE
      XRAN = ARAND(INIT, RMODE)
```

```
59            PCUM = PRI
60            LUSE(LOT, IPCH) = 5
61            IF (XRAN .GE. PCUM .AND. XRAN .LT. (PCUM + PRIMZ)) LUSE(LOT, IPCH)
62           1 = 6
63            PCUM = PCUM + PRIMZ
64            IF (XRAN .GE. PCUM .AND. XRAN .LT. (PCUM + PRIBM)) LUSE(LOT, IPCH)
65           1 = 13
66            PCUM = PCUM + PRIBM
67            IF (XRAN .GE. PCUM .AND. XRAN .LT. (PCUM + PRIMZB)) LUSE(LOT,IPCH)
68           1 = 15
69            PCUM = PCUM + PRIMZB
70            IF (XRAN .GE. PCUM .AND. XRAN .LT. (PCUM + PRISM)) LUSE(LOT, IPCH)
71           1 = 22
72            PCUM = PCUM + PRISM
73            IF (XRAN .GE. PCUM .AND. XRAN .LT. (PCUM + PRIMZS))LUSE(LOT,IPCH)
74           1 = 17
75            PCUM = PCUM + PRIMZS
76            IF (XRAN .GE. PCUM .AND. XRAN .LT. (PCUM + PRIPA))LUSE(LOT, IPCH)
77           1 = 19
78            GO TO 900
79          202 CONTINUE
80      C     MAIZE ALLOCATION
81      C     INTERPLANTING DECISIONS NOT INCLUDED TO AVOID DUPLICATION
82            LUSE(LOT, IPCH) = 7
83            GO TO 900
84          203 CONTINUE
85      C     PHASEOLUS ALLOCATION
86            XRAN = ARAND(INIT, -1.)
87            LUSE(LOT, IPCH) = 9
88            IF (XRAN .LT. PHPS) LUSE(LOT, IPCH) = 8
89            GO TO 900
90          204 CONTINUE
91      C     VIGNA ALLOCATION
92            XRAN = ARAND(INIT, -1.)
93            LUSE(LOT, IPCH) = 11
94            IF (XRAN .LT. PHVI) LUSE(LOT, IPCH) = 10
95            GO TO 900
96          205 CONTINUE
97      C     BITTER MANIOC ALLOCATION
98            RMODE = -1.
99            IF (ISTOCH .EQ. 2) GO TO 104
100           PR(1) = PRBM
101           PR(2) = PRBMRI
102           PR(3) = PRBMM2
103           PR(4) = 1. - PR(1) - PR(2) - PR(3) - PR(4)
104           XMAX = 0.
105           IMAX = 0.
106           DO 105 I=1,4
107           IF (XMAX .LE. PR(I)) GO TO 106
108           GO TO 105
109         106 XMAX = PR(I)
110           IMAX = I
111         105 CONTINUE
112           RMODE = 0.
113           DO 107 I2 = 1,IMAX
114           RMODE = RMODE + PR(I2)
115         107 CONTINUE
116           RMODE = RMODE - 0.0001
117         104 CONTINUE
118           XRAN = ARAND(INIT, RMODE)
```

```
119            LUSE(LOT, IPCH) = 12
120           PCUM = PRBM
121           IF (XRAN .GE. PRBM .AND.XRAN .LT. (PCUM+PRBMRI))LUSE(LOT,IPCH)=13
122           PCUM = PCUM + PRBMRI
123           IF (XRAN .GE. PCUM .AND. XRAN .LT.(PCUM + PRBMMZ))LUSE(LOT,IPCH)
124          1 = 14
125           PCUM = PCUM + PRBMMZ
126           IF (XRAN .GE. PCUM) LUSE(LOT, IPCH) = 15
127           GO TO 900
128         206 CONTINUE
129       C     SWEET MANIOC ALLOCATION
130           RMODE = -1.
131           IF (ISTOCH .EQ. 2) GO TO 108
132       C     CALCULATION OF MODE FOR DETERMINISTIC RUNS
133           PR(1) = PRSM
134           PR(2) = PRSMMI
135           PR(3) = PRSMMZ
136           PR(4) = 1. - PR(1) - PR(2) - PR(3)
137           XMAX = 0.
138           IMAX = 0
139           DO 109 I=1,4
140           IF (XMAX .LE. PR(I)) GO TO 110
141           GO TO 109
142         110 XMAX = PR(I)
143           IMAX = I
144         109 CONTINUE
145           RMODE = 0.
146           DO 111 I2=1,IMAX
147           RMODE = RMODE + PR(I2)
148         111 CONTINUE
149           RMODE = RMODE - 0.0001
150         108 CONTINUE
151           XRAN = ARAND(INIT, RMODE)
152            LUSE(LOT, IPCH) = 16
153           PCUM = PRSM
154           IF (XRAN .GE. PCUM .AND. XRAN .LT.(PCUM + PRSMRI)) LUSE(LOT, IPCH)
155          1 = 22
156           PCUM = PCUM + PRSMRI
157           IF (XRAN .GE. PCUM .AND. XRAN .LT.(PCUM + PRSMMZ)) LUSE(LOT, IPCH)
158          1 = 24
159           PCUM = PCUM + PRSMMZ
160           IF (XRAN .GE. PCUM) LUSE(LOT, IPCH)= 17
161           GO TO 900
162         207 CONTINUE
163       C     CACAO ALLOCATION
164           LUSE(LOT, IPCH) = 20
165           GO TO 900
166         208 CONTINUE
167       C     BLACK PEPPER ALLOCATION
168           LUSE(LOT, IPCH) = 21
169           GO TO 900
170         209 CONTINUE
171       C     PASTURE WITHOUT ANIMALS ALLOCATION
172           LUSE(LOT, IPCH) = 18
173           GO TO 900
174         210 CONTINUE
175       C     PASTURE WITH ANIMALS ALLOCATION
176           LUSE(LOT, IPCH) = 23
177         900 CONTINUE
178       C     DETERMINATION OF WHETHER A PATCH IS BURNED AND
```

```
   179      C        BURN QUALITY DETERMINATION
   180               XRAN = ARAND(INIT, -1.)
   181               IF (LASTUS(LOT, IPCH) .EQ.1 .AND. XRAN .LT. BURNPR(1))
   182              1   CALL VBQ(LOT, IPCH)
   183               IF (LASTUS(LOT, IPCH) .EQ. 6 .AND. XRAN .LT. BURNPR(2))
   184              1 CALL SGBQ(LOT, IPCH)
   184.1             IF (LASTUS(LOT, IPCH) .GE. 4 .OR. LASTUS(LOT, IPCH) .EQ. 1)
   184.2            1 GO TO 901
   184.3    C        FOR WEED BURNS
   184.4             IF (XRAN .LT. BURNPR(3)) BUTYP(LOT, IPCH) = 3
   184.5       901  CONTINUE
   185      C        AREA CLEARED TOTALS UPDATED
   186               IF (LASTUS(LOT, IPCH) .EQ. 1) AREACL(LOT) = AREACL(LOT) + SIZPCH
   187               RETURN
   188               END
END OF FILE
```

ARAND

Purpose:	Generation of uniformly distributed random numbers between 0 and 1.0. For deterministic runs this function returns either a value of 0.5 (for selecting the median of non-normally distributed probability distributions) or the value (RMODE) which will lead to the selection of the most common choice in the case of probabilistically determined branches. if RMODE is negative, then the mode selection value (RMODE) is not returned.
Kind of routine:	function (single precision)
Arguments:	INIT seed for pseudo-random number generation RMODE the mode, if this is desired during deterministic runs, or a negative number if a value of 0.5 is desired for median selection during deterministic runs.
COMMON areas:	DETERM
Routines called:	none (however the MTS URAND function is called)
Routine called by:	ALLOC, BUFFER, CBUEFF, CDISEA, HEALTH, ICLEAR, INITSQ, ITPORT, LEAVE, LUALLO, MAIN, MAINT, MZYLD, POPGEN, POPUL, PRALLO, PSYLD, RIYLD, SGBQ, STRAT, VBQ, VIYLD, WBUEFF
Program size:	440 bytes

```
      1            FUNCTION ARAND(INIT, RMODE)
      2      C     UNIFORMLY DISTRIBUTED RANDOM NUMBER BETWEEN 0 AND 1
      3      C     FOR DETERMINISTIC RUNS AN APPROPRIATE SUBSTITUTE IS
      4      C     RETURNED:  A VALUE OF 0.5 (FOR THE MEDIAN) FOR NON-NORMAL
      5      C     PROBABILITY DISTRIBUTIONS, AND THE MOST COMMON CHOICE (MODE)
      6      C     FOR PROBABILISTICALLY DETERMINED BRANCHES
      7            COMMON/DETERM/ ISTOCH
      8            IF (ISTOCH .EQ. 2) GO TO 800
      9            IF (RMODE .GE. 0.) GO TO 100
     10            ARAND = 0.5
     11            GO TO 900
     12        100 ARAND = RMODE
     13            GO TO 900
     14        800 ARAND = URAND(INIT)
     15        900 CONTINUE
     16            RETURN
     17            END
END OF FILE
```

BANK

Purpose:	Bank loans function: returns the amount due in cruzeiros of Jan. 1, 1975.
Kind of routine:	function (single precision)
Arguments:	LOT lot number
COMMON areas:	FIN, COLON, DATE, LOANS
Routines called:	none
Routine called by:	PRALLO
Program size:	1014 bytes

```
      1            FUNCTION BANK(LCT)
      2      C     BANK FUNCTION: RETURNS AMOUNT DUE (IN 1975 CRUZEIROS)
      3            COMMON/FIN/ ISOLV(10), DUEPRI(20), DUEINT(20), AMTLO(10, 20),
      4           1 LOANDA(10, 20), LOANTY(10, 20), MAXNLO, RAINFL
      5            COMMON/COLON/ LUPAT(10), CAPIT(10), CGOODS(10), AREACL(10),
      6           1 FAMLAB(10), MALES(10), FAMSIZ(10), CGOENT(10), CAPCON(10),
      7           2 MORTYP(10), IORIG(10), CGOCON(10), CAPENT(10)
      8            COMMON/DATE/ IYR
      9            COMMON/LOANS/  PCINT1(12),  PCINT2(12), MONCOR(12), IPERIO(12),
     10           1 IGRACE(12), AMTPHA(12), MAPIME(12), MAPISD(12), IBEGYR(12),
     11           2 IENDYR(12)
     12            DUE = 0.
     13            DO 100 LONO = 1, MAXNLO
     14            DUEPRI(LONO) = 0.
     15            DUEINT(LONO) = 0.
     16      C     CALCULATION OF AMOUNT DUE
     17            ITY = LOANTY(LCT, LONO)
     18            IF (ITY .EQ. 0) GO TO 100
     19      C     BYPASS FOR PRIVATE LOANS
     20            IF (ITY .EQ. 12) GO TO 100
     21            RATEIN = PCINT1(ITY) / 100.
     22            IF (ISOLV(LCT) .EQ. 2) RATEIN = PCINT2(ITY) / 100.
     23            IF (IYR .LT. (LOANDA(LCT, LONO) + IGRACE(ITY))) GO TO 101
     24      C     CALCULATION OF PRINCIPAL DUE
     25            DENOM =
     26           1  (FLOAT(IPERIO(ITY) - IGRACE(ITY) - 1) * FLOAT(IPERIO(ITY) -
     27           2 IGRACE(ITY)))
     28            IF (DENOM .LE. 0.01) GO TO 800
     29            DUEPRI(LONO) = FLOAT(IYR - IGRACE(ITY) + 1) * AMTLO(LCT, LONO)
     30           1 / DENOM
     31            GO TO 801
     32        800 DUEPRI(LONO) = AMTLO(LCT, LONO)
     33        801 CONTINUE
     34        101 DUEINT(LONO) = AMTLO(LCT, LONO) * RATEIN
     35            DUELO = DUEPRI(LONO) + DUEINT(LONO)
     36            IF (MONCOR(ITY) .EQ. 1) DUELO = DUELO * (1. - RAINFL) ** (FLOAT(
     37           1 IYR - LOANDA(LCT, LONO)))
     38            DUE = DUE + DUELO
     39        100 CONTINUE
     40            BANK = DUE
     41            RETURN
     42            END
END OF FILE
```

BLOCK DATA

Purpose:	declared input data
Kind of routine:	block data
Arguments:	none
COMMON areas:	MOWEA
Routines called:	none
Routine called by:	none (information referenced in WEAGEN)
Program size:	0

```
      1            BLOCK DATA
      2      C     MONTHLY WEATHER STANDARD DEVIATIONS
      3            COMMON/MCWEA/ SDRAIN(12), SDEVAP(12), SDINSO(12)
      4            DATA SDRAIN(1), SDRAIN(2), SDRAIN(3), SDRAIN(4), SDRAIN(5),
      5           1 SDRAIN(6), SDRAIN(7), SDRAIN(8), SDRAIN(9), SDRAIN(10),
      6           2 SDRAIN(11), SDRAIN(12)
      7           1 / 0.0485, 0.0490, 0.0412, 0.0478,
      8           1 0.0696, 0.0648, 0.0843, 0.1096, 0.0969, 0.1013, 0.1346, 0.0677/
      9            DATA SDEVAP(1), SDEVAP(2), SDEVAP(3), SDEVAP(4), SDEVAP(5),
     10           1 SDEVAP(6), SDEVAP(7), SDEVAP(8), SDEVAP(9), SDEVAP(10),
     11           2 SDEVAP(11), SDEVAP(12)
     12           1 / 0.0219, 0.0178, 0.0123, 0.0270,
     13           1 0.0258, 0.0302, 0.0342, 0.0267, 0.0289, 0.0250, 0.0150, 0.0302 /
     14            DATA SDINSO(1), SDINSO(2), SDINSO(3), SDINSO(4), SDINSO(5),
     15           1 SDINSO(6), SDINSO(7), SDINSO(8), SDINSO(9), SDINSO(10),
     16           2 SDINSO(11), SDINSO(12)
     17           1 / 0.0243, 0.0307, 0.0261,
     18           1 0.0289, 0.0667, 0.0313, 0.0162, 0.0108, 0.0136, 0.0231, 0.0263,
     19           2 0.0336/
     20            END
END OF FILE
```

BMYLD

Purpose:	bitter manioc yield
Kind of routine:	subroutine
Arguments:	LOT lot number
	IPCH patch number
COMMON areas:	SOIL, USECOM, YIELDS, TECHN
Routines called:	BRAND
Routine called by:	LOTPRO
Program size:	1050 bytes

```
      1            SUBROUTINE BMYLD(LOT, IPCH)
      2      C     BITTER MANIOC YIELD SUBROUTINE
      3            DOUBLE PRECISION BRAND
      4            DOUBLE PRECISION PHOS, PH, AL, NITRO, CARB, CLAY, SLOPE,
      5           1 PHADJ, PRYLME, PRYL, VBLTYD, GTHPER, GTHMUL
      6            COMMON/SOIL/ PHOS(10,100), PH(10,100), AL(10,100),
      7           1 NITRO(10,100), CARB(10,100), CLAY(10,100), SLOPE(10,100)
      8            COMMON/USECOM/ LUSE(10,100), IDUR(10,100), LASTUS(10,100),
      9           1 CONTIN(10,100)
     10            COMMON/TECHN/TECH(9), START(9)
     11            COMMON/YIELDS/ YLDRI, YLDMZ, YLDPS, YLDVI, YLDBM, YLDSM, YLDPE,
     12           1 YLDCA, YLDPA
     13            COMMON/YLDCAL/ ICRCAL(11)
     14            EXTERNAL BRAND
     15      C     FOLLOWING PREVENTS COUNTING MANIOC HARVEST MORE THAN
     16      C     ONCE.  HARVEST IS ONLY COUNTED FOR THE FIRST YEAR.
     17      C     NEGATIVE YIELD INDICATES TO LOTPRO SUBROUTINE THAT
     18      C     YIELD IS NOT TO BE COUNTED.
     19            YLDBM = -1.0
     20            IF (IDUR(LOT, IPCH) .GE. 365) GO TO 900
     21            IF (ICRCAL(10) .GE. 1) GO TO 100
     22      C     FIRST CALL FOR LOT AND YEAR
     23            ICRCAL(10) = 1
     24      C     INITIALIZATION OF GROWTH PERIOD MULTIPLIER
     25            GTHMUL = 1.0
     26      C     GROWTH PERIOD ASSIGNMENT (DAYS)
     27            GTHPER = BRAND(1.93D2, 4.72D2)
     28            IF (GTHPER .LE. 0.) GTHPER = 0.
     29      C     PH ADJUSTMENT FOR RESPONSE PLATEAU
     30            PHADJ = 5.0
     31            IF (PH(LOT, IPCH) .LE. PHADJ) PHADJ = PH(LOT, IPCH)
     32      C     CALCULATION OF GROWTH PERIOD MULTIPLIER
     33            IF (GTHPER .LT. 365.) GTHMUL = BRAND(4.0D-1, 3.18D0)
     34            IF (GTHPER .GT. 730.) GTHMUL = BRAND(0.37, 0.40)
     35            IF (GTHMUL .LE. 0.) GTHMUL = 0.
     36      C     CALCULATION OF REGRESSION PREDICTED YIELD (KG FARINHA/HA/12 MONTHS
     37      C     GROWTH)
     38            PRYLME = 4124.4 * PHADJ - 17369.
     39            PRYL = BRAND(4.14D2, PRYLME)
     40            VBLTYD = PRYL - PRYLME
     41        100 CONTINUE
     42      C     PH ADJUSTMENT FOR RESPONSE PLATEAU
     43            PHADJ = 5.0
     44            IF (PH(LOT, IPCH) .LE. PHADJ) PHADJ = PH(LOT, IPCH)
     45      C     CALCULATION OF REGRESSION PREDICTED YIELD (KG FARINHA/HA/12 MONTHS
     46      C     GROWTH)
     47            PRYLME = 4124.4 * PHADJ - 17369.
     48      C     BITTER MANIOC YIELD CALCULATION (KG FARINHA / HA)
     49            PRYL = PRYLME + VBLTYD
     50            IF (PRYL .LE. 0.) PRYL = 0.
     51            YLDBM = PRYL * GTHPER / 365. * GTHMUL
     52      C     ADJUSTMENT FOR TECHNOLOGICAL IMPROVEMENT
     53            YLDBM = YLDBM * TECH(5)
     54            IF (YLDBM .LE. 0.0) YLDBM = 0.0
     55        900 CONTINUE
     56            RETURN
     57            END
END OF FILE
```

BRAND

Purpose:	Generation of uniformly distributed random number with mean RMEAN and standard deviation SDEV. In deterministic runs the mean is returned.
Kind of routine:	function (double precision)
Arguments:	SDEV standard deviation RMEAN mean
COMMON areas:	RANDOM, DETERM
Routines called:	none (however the MTS GRANDI and GRAND system subroutines are called)
Routine called by:	BMYLD, CASHAL, CAYLD, CBUEFF, EROSN, HEALTH, IFINAN, INITSQ, LOANG, MZYLD, PASTSO, PEYLD, POPGEN, POPUL, PRALLO, PRICES, PSYLD, RIYLD, SGBQ, SMYLD, SOILCH, STRAT, UNBUCH, USETOT, VBQ, VBUEFF, VIYLD, WAGE, WBUEFF, WEAGEN
Program size:	434 bytes

```
      1            DOUBLE PRECISION FUNCTION BRANC(SDEV, RMEAN)
      2      C     NORMALLY DISTRIBUTED RANDOM NUMBER FROM THE
      3      C      DISTRIBUTION WITH THE GIVEN MEAN AND STANDARD DEVIATION
      4      C    FOR DETERMINISTIC RUNS THE MEAN IS RETURNED.
      5            DOUBLE PRECISION SDEV, RMEAN
      6            COMMON/DETERM/ ISTOCH
      7            COMMON/RANDOM/ INIT
      8            IF (ISTOCH .EQ. 1) GO TO 100
      9            CALL GRAND1(INIT)
     10            BRANC = GRANC(SDEV, RMEAN)
     11            GO TO 900
     12        100 BRAND = RMEAN
     13        900 CONTINUE
     14            RETURN
     15            END
END OF FILE
```

BUFFER

Purpose:	Buffers against colonist failure: returns the amount of cash (in cruzeiros of Jan. 1, 1975) which has been raised to meet the subsistence cash deficit of the colonist. Appropriate adjustments are made in private loan totals, and the various capital goods totals.
Kind of routine:	function (single precision)
Arguments:	LOT lot number
	cdefic cash deficit (Cruzeiros of Jan. 1, 1975)
COMMON areas:	DATE, RANDOM, COLON, FPROBS, FIN
Routines called:	LOANG, ARAND
Routine called by:	PRALLO
Program size:	1100 bytes

```
      FUNCTION BUFFER(LOT, CDEFIC)
C     BUFFER FUNCTION RETURNS AMOUNT OF CASH (IN 1975 CRUZEIROS) RAISED
C     FROM BUFFERS IF SUBSISTENCE NEED HAS NOT BEEN MET. BUFFER CASH
C     COMES FROM PRIVATE LOANS OR CAPITAL GOODS SALE.  APPROPRIATE
C     ADJUSTMENTS ARE MADE IN GOODS AND LOANS TOTALS.
C     CALLING ARGUMENTS ARE THE LOT AND AMOUNT OF CASH DEFICIT
      COMMON/DATE/ IYR
      COMMON/RANDOM/ INIT
      COMMON/COLON/ LUPAT(10), CAPIT(10), CGOODS(10), AREACL(10),
     1 FAMLAB(10), MALES(10), FAMSIZ(10), CGOENT(10), CAPCON(10),
     2 MORTYP(10), IORIG(10), CGOCON(10), CAPENT(10)
      COMMON/FIN/ ISOLV(10), DUEPRI(20), DUEINT(20), AMTLO(10, 20),
     1 LOANDA(10, 20), LCANTY(10, 20), MAXNLO, RAINFL
      COMMON/EPROBS/ PREIN(12)
      EXTERNAL ARAND
      CASH = 0.
C     DETERMINATION IF A PRIVATE LOAN CAN BE OBTAINED
      XRAN = ARAND(INIT, -1.)
      IF (XRAN .LT. PREIN(12)) GO TO 100
      GO TO 101
  100 CALL LOANG(LOT, 12, 0)
      DO 102 LOAN=1, MAXNLO
      IF (LCANTY(LOT, LOAN) .EQ. 12 .AND. LOANDA(LOT, LOAN) .EQ. IYR)
     1 GO TO 103
  102 CONTINUE
      GO TO 101
  103 CASH = CASH + AMTLO(LOT, LOAN)
  101 IF (CASH .GE. CDEFIC) GO TO 900
C     SALE OF CAPITAL GOODS IF PRIVATE LOANS INSUFFICIENT
      CNEED = CDEFIC - CASH
      IF (CGOCON(LOT) .LT. 1.) GO TO 106
C     CONSUMPTION DURABLE GOODS SOLD
      IF (CGOCON(LOT) .GE. CNEED) GO TO 107
      CASH = CASH + CGOCON(LOT)
      CGOCON(LOT) = 0.
      CNEED = CDEFIC - CASH
      GO TO 106
  107 CGOCON(LOT) = CGOCON(LOT) - CNEED
      CASH = CASH + CNEED
      GO TO 900
  106 CONTINUE
C     ENTERPRISE CAPITAL GOODS SOLD
      IF (CGOENT(LOT) .LT. 1.) GO TO 108
      IF (CGOENT(LOT) .GE. CNEED) GO TO 109
      CASH = CASH + CGOENT(LOT)
      CGOENT(LOT) = 0.
      CNEED = CDEFIC - CASH
      GO TO 108
  109 CGOENT(LOT) = CGOENT(LOT) - CNEED
      CASH = CASH + CNEED
      GO TO 900
  108 CONTINUE
C     LOT CAPITAL GOODS SOLD
      IF (CGOODS(LOT) .LT. 1.) GO TO 900
      IF (CGOODS(LOT) .GE. CNEED) GO TO 110
      CASH = CASH + CGOODS(LOT)
      CGOODS(LOT) = 0.
      GO TO 900
  110 CGOODS(LOT) = CGOODS(LOT) - CNEED
      CASH = CASH + CNEED
```

```
    61        900 CONTINUE
    62            BUFFER = CASH
    63            RETURN
    64            END
END OF FILE
```

CASHAL

Purpose:	Cash allocation: apportions cash (amount) between investment and consumption. Apportions investment cash between lot and enterprises. Apportions cash in all three categories (lot, enterprise, and consumption) between capital goods aquisition and other cash expenses.
Kind of routine:	subroutine
Arguments:	LOT lot number amount amount in cruzeiros of Jan. 1, 1975 to be allocated
COMMON areas:	COLON, CASHPR, WAGELA
Routines called:	BRAND
Routine called by:	STRAT, PRALLO
Program size:	1020 bytes

```
      1            SUBROUTINE CASHAL(LOT, AMT)
      2      C     CASH ALLOCATION SUBROUTINE FOR ASSIGNMENT OF CASH TO INVESTMENT
      3      C     OR CONSUMPTION, ALLOCATION OF INVESTMENT BETWEEN LOT DEVELOPMENT
      4      C     AND OTHER ENTERPRISES, AND ALLOCATION WITHIN EACH CASH CATEGORY
      5      C     (LOT, ENTERPRISES AND CONSUMPTION) BETWEEN CAPITAL (HERE MEANING
      6      C     DURABLE OR RE-SELLABLE) GOODS AND CASH CONSUMPTION.
      7      C     CALLING ARGUMENTS ARE LOT AND CRUZEIRO AMOUNT.
      8            DOUBLE PRECISION BRAND
      9            COMMON/COLON/ LUPAT(10), CAPIT(10), CGOODS(10), AREACL(10),
     10           1 FAMLAB(10), MALES(10), FAMSIZ(10), CGOENT(10), CAPCON(10),
     11           2 MORTYP(10), IORIG(10), CGOCON(10), CAPENT(10)
     12            COMMON/WAGELA/ LABPAT(10), PTYLAB(4, 4), TOLAME(4), TOLASD(4),
     13           1 RMLAME(4), RMLASD(4), EARNME(4), EARNSD(4), PLEAVE(2, 4)
     14            COMMON/CASHPR/ PRINME(4), PRINSD(4), PILOME, PILOSD, PRCG(3, 4)
     15            EXTERNAL BRAND
     16      C     DETERMINATION OF INVESTMENT CASH AND CONSUMPTION CASH
     17      C     PROPORTION INVESTED
     18            PINV = SNGL(BRAND(DBLE(PRINSD(MORTYP(LOT))),
     19           1 DBLE(PRINME(MORTYP(LOT)))))
     20            IF (PINV .LE. 0.) PINV = 0.
     21            IF (PINV .GE. 1.) PINV = 1.
     22            CASHIN = AMT * PINV
     23            CASHCO = AMT - CASHIN
     24      C     PROPORTION OF INVESTMENT CASH INVESTED IN LOT (AS OPPOSED TO
     25      C     ENTERPRISES)
     26            PRILOT = 1.
     27            IF (LABPAT(LOT) .EQ. 2 .OR. LABPAT(LOT) .EQ. 6) PRILOT =
     28           1 SNGL(BRAND(DBLE(PILOSD), DBLE(PILOME)))
     29            IF (PRILOT .LE. 0.) PRILOT = 0.
     30            IF (PRILOT .GE. 1.) PRILOT = 1.
     31      C     AMOUNT INVESTED IN LOT
     32            AMTLOT = PRILOT * CASHIN
     33      C     AMOUNT INVESTED IN ENTERPRISES
     34            AMTENT = CASHIN - AMTLOT
     35      C     AMOUNT TO CAPITAL GOODS FOR LOT DEVELOPMENT
     36            CGOODS(LOT) = CGOODS(LOT) + AMTLOT * PRCG(1, MORTYP(LOT))
     37      C     AMOUNT TO CASH FOR LOT DEVELOPMENT
     38            CAPIT(LOT) = CAPIT(LOT) + AMTLOT * (1. - PRCG(1, MORTYP(LOT)))
     39      C     AMOUNT TO CAPITAL GOODS FOR ENTERPRISES
     40            CGOENT(LOT) = CGOENT(LOT) + AMTENT * PRCG(2, MORTYP(LOT))
     41      C     AMOUNT TO CASH FOR ENTERPRISES
     42            CAPENT(LOT) = CAPENT(LOT) + AMTENT *(1. - PRCG(2, MORTYP(LOT)))
     43      C     AMOUNT TO CONSUMPTION DURABLE GOODS
     44            CGOCON(LOT) = CGOCON(LOT) + CASHCO * PRCG(3, MORTYP(LOT))
     45      C     AMOUNT TO CONSUMPTION CASH
     46            CAPCON(LOT) = CAPCON(LOT) + CASHCO * (1. - PRCG(3, MORTYP(LOT)))
     47            RETURN
     48            END
END OF FILE
```

CAYLD

Purpose:	cacao yield
Kind of routine:	subroutine
Arguments:	LOT lot number
	IPCH patch number
COMMON areas:	SOIL, DATE, TECHN, YIELDS, DISEA
Routines called:	BRAND
Routine called by:	LOTPRO
Program size:	1074 bytes

```
      1            SUBROUTINE CAYLD(LOT, IPCH)
      2      C     CACAO YIELD SUBROUTINE
      3            DOUBLE PRECISION BRAND
      4            DOUBLE PRECISION PHOS, PH, AL, NITRO, CARB, CLAY, PHADJ, SLOPE
      5            COMMON/SOIL/ PHOS(10,100), PH(10,100), AL(10,100),
      6           1 NITRO(10,100), CARB(10,100), CLAY(10,100), SLOPE(10,100)
      7            COMMON/USECOM/ LUSE(10,100), IDUR(10,100), LASTUS(10,100),
      8           1 CONTIN(10,100)
      9            COMMON/DATE/ IYR
     10            COMMON/TECHN/ TECH(9), START(9)
     11            COMMON/YIELDS/ YLDRI, YLDM2, YLDPS, YLDVI, YLDBM, YLDSM, YLDPE,
     12           1 YLDCA, YLDPA
     13            COMMON/DISEA/ PINFEC(3, 2), LSPORE(3), IBPOD(10,100),
     14           1 IWBROO(10,100), IFUSAR(10,100), IWBEST, IFUEST, IBPEST, BPMULT,
     15           2 WBMULT, FUMULT, PRDIES(3)
     16            EXTERNAL BRAND
     17      C     ADJUSTMENT FOR RESPONSE PLATEAU AT CACAO CRITICAL PH (CACRPH)
     18      C     FOLLOWING FOR DEATH OF CACAO EXCEEDING
     19      C     LIFE EXPECTANCY OF 90 YEARS (32873 DAYS)
     20            YLDCA = 0.
     21            IF (IDUR(LOT, IPCH) .LT. 32873) GO TO 101
     22            LUSE (LOT, IPCH) = 2
     23            IDUR(LOT, IPCH) = 0
     24            GO TO 900
     25          101 CONTINUE
     26            CACRPH = 7.5
     27            PHADJ = PH(LOT, IPCH)
     28            IF (PHADJ .GE. CACRPH) PHADJ = CACRPH
     29      C     CACAO YIELD FROM SOIL MEAN
     30            CYPSME = 193.21 * PHADJ - 744.29
     31      C     CACAO YIELD FROM SOIL
     32            CAYPS = SNGL(BRAND(1.2374D2, DBLE(CYPSME)))
     33      C     ADJUSTMENT FOR SCALING BRAZIL MAXIMUM CACAO YIELDS (CACMAX) AND
     34      C     REGRESSION PREDICTED CACAO YIELD FROM SOIL BASED ON TRINIDAD DATA
     35            CAYPS = CAYPS *START(7)/ 710.
     36      C     CACAO YEAR EFFECT (FOR FIELDS LESS THAN 5 YRS OLD)
     37            CAYREF = 1.
     38            IF (IDUR(LOT, IPCH) .GE. 1826) GO TO 100
     39            CAYREF = 0.750
     40            IF (IDUR(LOT, IPCH) .LT. 1461) CAYREF = 0.375
     41            IF (IDUR(LOT, IPCH) .LT. 1096) CAYREF = 0.125
     42            IF (IDUR(LOT, IPCH) .LT. 730)  CAYREF = 0.
     43          100 CONTINUE
     44      C     BLACK POD DISEASE EFFECT
     45            BPEFF = 1.
     46            IF (IBPOD(LOT, IPCH) .EQ. IYR) BPEFF = BPMULT
     47      C     WITCHES BROOM EFFECT
     48            WBEFF = 1.
     49            IF (IWBROO(LOT, IPCH) .EQ. IYR) WBEFF = WBMULT
     50      C     CALCULATE CACAO YIELD (KG DRY SEEDS / HA)
     51            YLDCA = CAYPS * CAYREF  * BPEFF * WBEFF
     52      C     ADJUSTMENT FOR TECHNOLOGICAL IMPROVEMENT
     53            YLDCA = YLDCA * TECH(7)
     54            IF (YLDCA .LE. 0.) YLDCA = 0.
     55          900 CONTINUE
     56            RETURN
     57            END
END OF FILE
```

CBUEFF

Purpose:	"capoeira" (second growth) burn effects
Kind of routine:	subroutine
Arguments:	LOT lot number
	IPCH patch number
COMMON areas:	BURNS, BUCHNG, UBCHNG, SOIL, RANDOM, BEFORE, UTCOM
Routines called:	ARAND, BRAND
Routine called by:	SOILCH
Program size:	1136 bytes

```
      1            SUBROUTINE CBUEFF(LOT, IPCH)
      2      C     SECOND GROWTH BURN EFFECTS SUBROUTINE
      3            INTEGER BUQUAL, BUTYP
      4            DOUBLE PRECISION BRAND
      5            DOUBLE PRECISION PHOS, PH, AL, NITRO, CARB, CLAY, SLOPE, PHCH,
      6           1 ALCH, PCH, RNCH, UBPHCH, UBALCH, UBPCH, UBNCH, PHCHME, RNCHME,
      7           2  ALCHME, PHBEFF, ALBEFF, CBEFF, RNBEFF, PBEFF, CBQDUM
      8            COMMON/BURNS/ BUTYP(10,100), BUQUAL(10,100)
      9            COMMON/BUCHNG/ PHCH, ALCH, PCH, RNCH
     10            COMMON/UBCHNG/ UBPHCH, UBALCH, UBPCH, UBNCH
     11            COMMON/SOIL/ PHOS(10,100), PH(10,100), AL(10,100),
     12           1 NITRO(10,100), CARB(10,100), CLAY(10,100), SLOPE(10,100)
     13            COMMON/RANDOM/ INIT
     14            COMMON/BEFORE/ PHBEFF, ALBEFF, CBEFF, RNBEFF, PBEFF
     15            COMMON/UTCOM/ LUMAXB(10,100), DAYSBA(10,100), DAYSAC(10,100),
     16           1 DAYSTC(10,100), DAYSPA(10,100), DAYSFA(10,100),
     17           2 RAINBA(10, 100),RAINAL(10,100)
     18            EXTERNAL ARAND, BRAND
     19      C     SECOND GROWTH BURN QUALITY DUMMY VARIABLE ASSIGNMENT
     20            CBQDUM = -1.
     21            IF (BUQUAL(LOT, IPCH) .LE. 1) CBQDUM = 1.
     22      C     PHOSPHORUS CHANGE CALCULATION
     23            PCHME = 0.741 * UBPCH - 0.831 * CBQDUM - 1.52
     24            PCH = BRAND(2.62D0, PCHME)
     25      C     ALUMINUM CHANGE CALCULATION
     26            IF (ALBEFF .GT. 0.001) GO TO 100
     27      C     FOR BEFORE FIELD ALUMINUM = 0.
     28            XRAN = ARAND(INIT, -1.)
     29            IF (XRAN .LT. 0.70) ALCH = 0.
     30            IF (XRAN .GE. 0.70 .AND. XRAN .LT. 0.90) ALCH = 0.1
     31            IF (XRAN .GE. 0.90 .AND. XRAN .LT. 0.95) ALCH = 0.2
     32            IF (XRAN .GE. 0.95) ALCH = 0.4
     33            GO TO 101
     34        100 CONTINUE
     35      C     FOR BEFORE FIELD ALUMINUM GREATER THAN 0.
     36            ALCHME = 0.166 - 0.267 * ALBEFF
     37            ALCH = BRAND(1.53D0, ALCHME)
     38        101 CONTINUE
     39      C     PH CHANGE CALCULATION
     40            PHCHME = 3.4817D0 - 2.2603D-1 * ALBEFF - 2.3129D-1 * ALCH -
     41           1 3.37D-4 * DAYSAC(LOT, IPCH)  - 5.1758D-1 * PHBEFF
     42            PHCH = BRAND(6.46D-1, PHCHME)
     43      C     CALCULATION OF NITROGEN CHANGE
     44            BUNEF = BRAND(5.6D-2, -3.3D-2)
     45            RNCH = BUNEF + UBNCH
     46            RETURN
     47            END
END OF FILE
```

CDISEA

Purpose:	Crop diseases: makes decision of disease attack for cacao and pepper based on length of time since last diseased plants were in the patch, and the establishment of the disease in the area.
Kind of routine:	subroutine
Arguments:	none
COMMON areas:	DATE, SIZES, RANDOM, USECOM, DISEA
Routines called:	ARAND
Routine called by:	MAIN
Program size:	1474 bytes

```
      SUBROUTINE CDISEA
C     CROP DISEASE SUBROUTINE (FOR PERENNIAL CROPS)
      COMMON/DATE/ IYR
      COMMON/SIZES/ LOTS, NOPCHS, SIZLOT, SIZPCH
      COMMON/RANDOM/ INIT
      COMMON/USECON/ LUSE(10,100), IDUR(10,100), LASTUS(10,100),
     1CONTIN(10,100)
      COMMON/DISEA/ PINFEC(3, 2), LSPORE(3), IBPOD(10,100),
     1 IWBROO(10,100), IFUSAR(10,100), IWBEST, IFUEST, IBPEST,
     1 BPMULT, WBMULT, FUMULT, PBDIES(3)
      EXTERNAL ARAND
      DO 100 LO = 1, LOTS
      DO 101 IP = 1, NOPCHS
      IDIS = 0
C     BLACK POD
      IF (IBPOD(LO, IP) .EQ. 0) GO TO 105
      IBPEST = 2
C     YEARS SINCE DISEASE
      IYRSSD = IYR - IBPOD(LO, IP)
      IF (IYRSSD .GT. LSPORE(3)) GO TO 400
      IF (LUSE(LO, IP) .EQ. 20) IBPOD(LO, IP) = IYR
  105 CONTINUE
C     WITCHES BROOM
      IF (IWBROO(LO, IP) .EQ. 0) GO TO 103
C     YEARS SINCE DISEASE
      IWBEST = 2
      IYRSSD = IYR - IWBROO(LO, IP)
      IF (IYRSSD .GT. LSPORE(2)) GO TO 401
      IF (LUSE(LO, IP) .EQ. 20) IWBROO(LO, IP) = IYR
  103 CONTINUE
C     FUSARIUM
      IF (IFUSAR(LO, IP) .EQ. 0) GO TO 402
      IFUEST = 2
C     YEARS SINCE DISEASE
      IYRSSD = IYR - IFUSAR(LO, IP)
      IF (IYRSSD .GT. LSPORE(1)) GO TO 403
      IF (LUSE(LO, IP) .EQ. 21) IFUSAR(LO, IP) = IYR
      IDIS = 1
      GO TO 402
  400 IBPOD(LO, IP) = 0
      IBPEST = 1
      GO TO 105
  402 CONTINUE
      IF (LUSE(LO, IP) .EQ. 20) GO TO 104
      IF (LUSE(LO, IP) .EQ. 21) GO TO 304
      GO TO 101
  104 CONTINUE
C     BLACK POD DECISION
      XRAN = ABAND(INIT, -1.)
      IF (XRAN .LT. PINFEC(3, IBPEST)) IBPOD(LO, IP) = IYR
      IF (IBPOD(LO, IP) .LT. IYR) GO TO 204
C     DETERMINATION OF CROP DEATH
      XRAN = ABAND(INIT, -1.)
      IF (XRAN .GE. PBDIES(3)) GO TO 204
      LUSE(LO, IP) = 2
      IDUR(LO, IP) = 0
      GO TO 101
  401 IWBROO(LO, IP) = 0
      IWBEST = 1
      GO TO 103
```

```
      204 CONTINUE
C         WITCHES BROOM DECISION
          XRAN = ARAND(INIT, -1.)
          IF (XRAN .LT. PINFEC(2, IWBEST)) IWBROO(LO, IP) = IYR
          IDIS = 2
          IF (IWBROO(LO, IP) .EQ. IYR) GO TO 200
          GO TO 101
      403 IFUSAR(LO, IP) = 0
          IFUEST = 1
          GO TO 402
      304 CONTINUE
C         PATCHES IN PEPPER
C         FUSARIUM DECISION
          XRAN = ARAND(INIT, -1.)
          IF (XRAN .LT. PINFEC(1, IFUEST)) IFUSAR(LO, IP) = IYR
          IDIS = 1
          IF (IFUSAR(LO, IP) .LT. IYR) GO TO 101
      200 XRAN = ARAND(INIT, -1.)
C         DETERMINATION OF CROP DEATH
          IF (XRAN .GE. PRDIES(IDIS)) GO TO 101
          LUSE(LO, IP) = 2
          IDUR(LO, IP) = 0
      101 CONTINUE
      100 CONTINUE
          RETURN
          END
END OF FILE
```

EROSN

Purpose:	erosion loss prediction
Kind of routine	subroutine
Arguments:	LOT lot number
	IPCH patch number
COMMON areas:	EROCOM, SOIL, UTCOM
Routines called:	BRAND
Routine called by:	MAIN
Program size:	1590 bytes

```
      SUBROUTINE EROSN(LOT, IPCH)
C     EROSION SUBROUTINE
      DOUBLE PRECISION BRAND
      DOUBLE PRECISION PHOS, PH, AL, NITRO, CARB, CLAY,
     1 SLOPE
      COMMON/EROCOM/ EROS
      COMMON/SOIL/ PHOS(10,100), PH(10,100), AL(10,100),
     1 NITRO(10,100), CARB(10,100), CLAY(10,100), SLOPE(10,100)
      COMMON/UTCOM/ LUMAXR(10,100), DAYSBA(10,100), DAYSAC(10,100),
     1 DAYSTC(10,100), DAYSPA(10,100), DAYSFA(10,100),
     2 RAINBA(10,100), RAINAC(10,100)
      EXTERNAL BRAND
      IF (LUMAXR(LOT, IPCH) .EQ. 2) GO TO 100
      GO TO 101
  100 CONTINUE
C     EROSION CALCULATION FOR LAND USE ANNUAL CROPS OR BARE AT TIME OF
C     MAXIMUM RAINFALL IN 24 HOURS
      EROME = 0.164 * SLOPE(LOT, IPCH) + 1.88D-3 * RAINBA(LOT,IPCH)
     1 + 1.48
      EROS = SNGL(BRAND(2.13D0, DBLE(EROME)))
      GO TO 200
  101 CONTINUE
C     EROSION CALCULATION FOR LAND USE VIRGIN, SECOND GROWTH, WEEDS,
C     PASTURE, CACAO OR PEPPER AT TIME OF MAXIMUM RAINFALL
      PLERTO = 0.
      DO 103 I1 = 1, 15
C     DOES ONE ITERATION FOR EACH "STAKE" IN THE HYPOTHETICAL "EROSION
C     PLOT"
      STSLME = 0.462 * SLOPE(LOT, IPCH) + 3.13
      STSLOP = SNGL(BRAND(4.94D0, DBLE(STSLME)))
      IF (STSLOP .LE. 0.) STSLOP = 0.
      IF (LUMAXR(LOT, IPCH) .EQ. 3) GO TO 104
      IF (LUMAXR(LOT, IPCH) .EQ. 4) GO TO 105
      IF (LUMAXR(LOT, IPCH) .EQ. 5) GO TO 106
      IF (LUMAXR(LOT, IPCH) .EQ. 6) GO TO 107
      IF (LUMAXR(LOT, IPCH) .EQ. 1) GO TO 108
      IF (LUMAXR(LOT, IPCH) .EQ. 7) GO TO 109
      WRITE (6, 1000) LUMAXR(LOT, IPCH)
 1000 FORMAT(1X, 'ERROR: LAND USE AT MAX. RAIN', I5, 2X,
     1 'NOT RECOGNIZED IN EROSION SUBROUTINE')
      CALL SYSTEM
  104 CONTINUE
C     EROSION CALCULATION FOR BLACK PEPPER AT TIME OF MAX. RAIN
      STERME = 0.712 * STSLOP + 6.05
      STEROS = SNGL(BRAND(6.10D0, DBLE(STERME)))
      GO TO 102
  105 CONTINUE
C     EROSION CALCULATION FOR CACAO AT TIME OF MAX. RAIN
      STEROS = SNGL(BRAND(8.3D0, 1.00D1))
      GO TO 102
  106 CONTINUE
C     EROSION CALCULATION FOR PASTURE AT TIME OF MAX. RAIN
      STEROS = SNGL(BRAND(1.18D1, 6.7D0))
      GO TO 102
  107 CONTINUE
C     EROSION CALCULATION FOR WEEDS AT TIME OF MAX. RAIN
      STEROS = SNGL(BRAND(5.4D0, 8.1D0))
      GO TO 102
  108 CONTINUE
C     EROSION CALCULATION FOR VIRGIN AT TIME OF MAX. RAIN
```

```
      61            STEROS = SNGL(BRAND(5.1D0, 7.5D0))
      62            GO TO 102
      63          109 CONTINUE
      64      C       EROSION CALCULATION FOR SECOND GROWTH AT TIME OF MAX. RAIN
      65            STEROS = SNGL(BRAND(8.7D0, 6.9D0))
      66          102 CONTINUE
      67      C       CALCULATION OF "PLOT" EROSION
      68            PLERTO = PLERTO + STEROS
      69          103 CONTINUE
      70            EROS = PLERTO / 15.
      71          200 CONTINUE
      72            RETURN
      73            END
END OF FILE
```

HEALTH

Purpose:	human health: health effects on labor (note: no effects on mortality or natality included here)
Kind of routine:	subroutine
Arguments:	LOT lot number
COMMON areas:	FLAB, COLON, SICK, POP, RANDOM
Routines called:	ARAND, BRAND
Routine called by:	LUALLO
Program size:	1512 bytes

```
      SUBROUTINE HEALTH(LOT)
C     HEALTH EFFECTS ON LABOR SUBROUTINE
      DOUBLE PRECISION BRAND
      COMMON/FLAB/ FLTOT(12), FLMALE(12), LABCAL
      COMMON/COLON/ LUPAT(10), CAPIT(10), CGOODS(10), AREACL(10),
     1 FAMLAB(10), MALES(10), FAMSIZ(10), CGOENT(10), CAPCON(10),
     2 MORTYP(10), IORIG(10), CGOCON(10), CAPENT(10)
      COMMON/SICK/ DALOME(3), DALOSC(3), PDISEA(3, 2, 13), PDISMO(3, 12)
      COMMON/POP/ MALE(10, 86), IFEM(10, 86), FAMSTR(10, 2), PDEP(86,2),
     1  FLEQUI(2, 5), PDEATH(2, 86), PINDEM(2, 86),
     2 PINDIM, PBIRTH(44), CALAGE(8), PROAGE(19), MARIT(10),
     3 PMARRY, AGBRME, AGBRSD, PMIMIG, PRIMAG(2, 86),
     4 CALREC(25), PROREC(8)
      COMMON/RANDOM/ INIT
      EXTERNAL ARAND, BRAND
      DO 599 IDISEA = 1, 3
      DO 600 IAG = 7, 86
      DO 601 ISEX = 1, 2
      IF (ISEX .EQ. 2) GO TO 608
      IF (MALE(LOT, IAG) .EQ. 0) GO TO 601
      INDIVS = MALE(LOT, IAG)
      GO TO 609
  608 IF (IFEM(LOT, IAG) .EQ. 0) GO TO 601
      INDIVS = IFEM(LOT, IAG)
  609 CONTINUE
C     ASSIGNMENT OF DISEASE AGE CLASS
C     NOTE "IAG" IS ACTUALLY AGE IN YEARS + 1
      IAGCL = (IAG - 1) / 5  + 1
      IF (IAGCL .GE. 13) IAGCL = 13
      DO 602 IND = 1, INDIVS
C     DETERMINE IF INDIVIDUAL HAS MALARIA ATTACK AT ANY TIME DURING YEAR
      XRAN = ARAND(INIT, -1.)
      IF (XRAN .GE. PDISEA(IDISEA, ISEX, IAGCL)) GO TO 602
C     DETERMINE LABOR AGE CLASS
      LAAGCL = 5
      IF (IAG .LE. 18) LAAGCL = 4
      IF (IAG .LE. 14) LAAGCL = 3
      IF (IAG .LE. 19) LAAGCL = 2
C     DETEMINATION OF MONTH IN WHICH DISEASE STRIKES
      XRAN = ARAND(INIT, -1.)
      PCUM = 0.
      DO 603 ICMO = 1, 12
      PCUM = PCUM + PDISMO(IDISEA, ICMO)
      IF (XRAN .LT. PCUM) GO TO 611
      GO TO 603
  611 CONTINUE
C     DETERMINATION OF LABOR LOST TO DISEASE
      DALOST = SNGL(BRAND(DBLE(DALOSC(IDISEA)),
     1 DBLE(DALOME(IDISEA))))
      IF (DALOST .LE. 0.) DALOST = 0.
      MODIS = ICMO
  612 FLTOT(MODIS) = FLTOT(MODIS) - DALOST * FLEQUI(ISEX, LAAGCL)
      IF (ISEX .EQ. 1 .AND. LAAGCL .EQ. 5) FLMALE(MODIS) = FLMALE(MODIS)
     1 - DALOST
      IF (FLTOT(MODIS) .LE. 0.) FLTOT(MODIS) = 0.
      IF (FLMALE(MODIS) .LE. 0.) FLMALE(MODIS) = 0.
      IF (DALOST .LE. 30.) GO TO 603
C     PROVISION FOR DISEASE LASTING MORE THAN ONE MONTH
      DALOST = DALOST - 30.
      MODIS = MODIS + 1
```

```
      IF (MODIS .GE. 13) MODIS = 1
      GO TO 612
  603 CONTINUE
  602 CONTINUE
  601 CONTINUE
  600 CONTINUE
  599 CONTINUE
      RETURN
      END
END OF FILE
```

HUNT

Purpose:	hunting: calculates game catch for lot if colonist is a hunter, makes appropriate adjustments in game eaten, consumption cash, and community game selling pool, as well as family labor and male labor.
Kind of routine:	subroutine
Arguments:	LOT lot number
COMMON areas:	NEED, PRIC, DATE, FOOD, GAME, COLON, FLAB
Routines called:	none
Routine called by:	LABOR
Program size:	approximately 1000 bytes

```
      SUBROUTINE HUNT(LOT)
C     HUNTING SUBROUTINE: CALCULATES GAME CATCH FOR LOT IF COLONIST IS
C     A HUNTER, DEDUCTS TIME SPENT FROM FAMILY LABOR AND MALE LABOR,
C     ADJUSTS GAME IN LOT, SELLING GAME POOL FOR EXCESS, AND
C     CONSUMPTION CASH FOR GAME SOLD.
      COMMON/NEED/SUKGRI,SUKGMZ,SUKGBE,SUKGMN,SUCASH,ZCRISK,SUKGMT
      COMMON/PRIC/ YRBUPR(17), YRSEPR(17)
      COMMON/DATE/ IYR
      COMMON/FOOD/ EAT(17), SUBNCR, EATGAM(10)
      COMMON/GAME/ SMEAT, IHUNT(10), PHUNT, IENDHU, EFFORT(12), YLDSLO,
     1 YLDINT, EFFSLO, EFFINT, GWASTE
      COMMON/COLON/ LUPAT(10), CAPIT(10), CGOODS(10), AREACL(10),
     1 FAMLAB(10), MALES(10), FAMSIZ(10), CGOENT(10), CAPCON(10),
     2 MORTYP(10), IORIG(10), CGOCON(10), CAPENT(10)
      COMMON/FLAB/ FLTOT(12), FLMALE(12), LABCAL
C     INITIALIZATION OF GAME EATEN FOR LOT
      EATGAM(LOT) = 0.
C     BYPASS FOR YEARS AFTER END OF HUNTING
      IF (IYR .GT. IENDHU) GO TO 900
      IF (IHUNT(LOT) .EQ. 2) GO TO 900
      IF (IHUNT(LOT) .EQ. 1) GO TO 101
      WRITE (6, 1000) LOT, IYR
 1000 FORMAT(1X, 'ERROR: HUNTING CLASS UNASSIGNED IN HUNT FOR LOT=', I5,
     1 2X, 'YEAR=', I5)
      CALL SYSTEM
  101 CONTINUE
C     FOR HUNTERS
C     CALCULATION OF TOTAL EFFORT FOR YEAR (MAN-DAYS/HUNTER/YEAR)
      TOTEFF = EFFSLO * FLOAT(IYR) + EFFINT
C     CALCULATION OF YIELD PER MAN-DAY (KG.LIVE WT./MAN-DAY)
      YLDPMD = YLDSLO * FLOAT(IYR) + YLDINT
C     CALCULATION OF SUBSISTENCE NEED FOR GAME FOR ONE MONTH (DRESSED)
      SUNMGM = SUKGMT * FAMSIZ(LOT) / 12.
      DO 102 MO = 1, 12
C     CALCULATION OF EFFORT (MAN-DAYS/HUNTER) IN EACH CALENDAR MONTH
      EFFMO = EFFORT(MO) * TOTEFF
C     CALCULATION OF FAMILY LABOR AND MALE LABOR FOR MONTH
      FLTOT(MO) = FLTOT(MO) - EFFMO
      FLMALE(MO) = FLMALE(MO) - EFFMO
C     CALCULATION OF BAG (LIVE WT.) FOR EACH MONTH
      BAGMO = EFFMO * YLDPMD
C     ADJUSTMENT OF LIVE WEIGHT TO DRESSED WEIGHT
      BAGMO = BAGMO * (1. - GWASTE)
C     CALCULATION OF AMOUNT EATEN (SUBSISTENCE NEED FOR MONTH)
      IF (BAGMO .GT. SUNMGM) GO TO 103
C     CASE OF MONTHLY BAG INSUFFICIENT FOR SUBSISTENCE NEED
      EATGAM(LOT) = EATGAM(LOT) + BAGMO
      GO TO 102
  103 CONTINUE
C     CASE OF MONTHLY BAG SUFFICIENT TO MEET SUBSISTENCE NEED
      EATGAM(LOT) = EATGAM(LOT) + SUNMGM
      CAPCON(LOT) = CAPCON(LOT) + (BAGMO - SUNMGM) * YRSEPR(14)
C     ADDITION OF MEAT NOT EATEN TO SALE MEAT POOL FOR COMMUNITY
      SMEAT = SMEAT + BAGMO - SUNMGM
  102 CONTINUE
  900 CONTINUE
      RETURN
      END
END OF FILE
```

ICLEAR

Purpose:	clearing: returns number of patches next in line for "clearing" (preparation including weeds, second growth, or virgin).
Kind of routine:	function (integer)
Arguments:	LOT lot number
	IPCH patch number
COMMON areas:	USECOM, SIZES, RANDOM, VIRGCL, WEEDS, LOANS, COLON
Routines called:	ARAND, IFINAN
Routine called by:	LUALLO
Program size:	3894 bytes

LABOR

Purpose:	labor and capital sufficiency checks. Returns 1 if labor and capital are sufficient, 2 if not sufficient for allocation of patch to a proposed use. Adjustments in family labor total, male labor, and capital are made if successful (sufficient).
Kind of routine:	function (integer)
Arguments:	LOT lot number IPCH patch number LUCOD land use code of proposed use (see codes section)
COMMON areas:	REQUIR, SIZES, COSTS, COLON, DATE, FLAB, USECOM
Routines called:	HUNT
Routine called by:	LUALLO
Program size:	2344 bytes

```
      FUNCTION LABOR(LOT, IPCH, LUCOD)
C     LABOR AND CAPITAL SUFFICIENCY CHECK FUNCTION.  ARGUMENTS ARE LOT,
C     PATCH AND LAND USE CODE (FOR PURE CROP).
C     RETURNS: 1=SUFFICIENT LABOR AND CAPITAL.  2=INSUFFICIENT.
C     ADJUSTMENTS IN FAMILY LABOR TOTAL, MALE LABOR AND CAPITAL MADE IF
C     SUCCESSFUL (SUFFICIENT).
      DIMENSION   TENML(12), TENTAT(12)
      COMMON/REQUIR/ REQTL(12, 15), REQML(12, 15), REQFC(12, 15)
      COMMON/SIZES/ LOTS, NOPCHS, SIZLOT, SIZPCH
      COMMON/COSTS/ COLAB(12), BUYME(17), BUYSD(17), SELLME(17),
     1 SELLSD(17)
      COMMON/FLAS/ FLTOT(12), FLMALE(12), LABCAL
      COMMON/COLON/ LUPAT(10), CAPIT(10), CGOODS(10), AREACL(10),
     1 FAMLAB(10), MALES(10), FAMSIZ(10), CGOENT(10), CAPCON(10),
     2 MORTYP(10), IORIG(10), CGOCON(10), CAPENT(10)
      COMMON/USECOM/ LUSE(10,100), IDUR(10,100), LASTUS(10,100),
     1 CONTIN(10,100)
      COMMON/DATE/ IYR
      LABOR = 2
      IF (LABCAL .EQ. 1) GO TO 100
      GO TO 101
  100 CONTINUE
C     LABOR CALL INDICATOR SET TO INDICATE PREVIOUS CALL FOR LOT
      LABCAL = 2
C     LAST LOT INDICATOR
      LASTLT = LOT
      CALL HUNT(LOT)
  101 CONTINUE
      TENCAP = CAPIT(LOT)
      DO 500 IMTH = 1, 12
C     "IMTH" IS THE CALENDAR MONTH
      TENML(IMTH) = FLMALE(IMTH)
  500 TENTAT(IMTH) = FLTOT(IMTH)
C     ASSIGNMENT OF OPERATION (FOR CLEARING) BASED ON LAST USE
      IF (LASTUS(LOT, IPCH) .EQ. 1) IOPER = 1
      IF (LASTUS(LOT, IPCH) .EQ. 4) IOPER = 2
      IF (LASTUS(LOT, IPCH) .GE. 2 .AND. LASTUS(LOT, IPCH) .LE. 17)
     1 IOPER = 3
      IF(LASTUS(LOT,IPCH).EQ.22.OR.LASTUS(LOT,IPCH).EQ.24)IOPER=3
      IF(LASTUS(LOT,IPCH).EQ.20.OR.LASTUS(LOT,IPCH).EQ.21)GO TO 900
      IF(LASTUS(LOT,IPCH).EQ.18.OR.LASTUS(LOT,IPCH).EQ.19)GO TO 960
      IF(LASTUS(LOT,IPCH).EQ.23) GO TO 960
      GO TO 200
  960 IF (LUCOD .NE. 16 .AND. LUCOD .NE. 23) GO TO 900
  501 CONTINUE
      IOPER = 0
      IF (LUCOD .EQ. 5) IOPER = 4
      IF (LUCOD .EQ. 7) IOPER = 5
      IF (LUCOD .EQ. 8) IOPER = 6
      IF (LUCOD .EQ.10) IOPER = 6
      IF (LUCOD .EQ.12) IOPER = 7
      IF (LUCOD .EQ. 16) IOPER = 7
      IF (LUCOD .EQ. 20) IOPER = 8
      IF (LUCOD .EQ. 21) IOPER = 9
      IF (LUCOD .EQ. 18) IOPER =10
      IF (LUCOD .EQ. 23) IOPER =11
      IF (IOPER .GE. 1) GO TO 200
      WRITE (6,  1000) LUCOD
 1000 FORMAT(1X, 'ERROR: LAND USE CODE', I5, 2X,
     1 'NOT RECOGNIZED IN LABOR')
```

```
      FUNCTION ICLEAR(LOT, IPCH)
C     CLEARING (LAND PREPARATION INCLUDING WEED AND SECOND GROWTH AS
C     WELL AS VIRGIN) FUNCTION: RETURNS NUMBER OF PATCH WITH THE LOWEST
C     CLEARING PREFERENCE WHICH HAS NOT YET BEEN"CLEARED"(PREPARED).
C     CATEGORY OF CLEARING CLASS (ICAT) AND PREVIOUS CLEARING INDICATOR
C     (IDONE) DIMENSIONED FOR NUMBER OF PATCHES PER LOT.
      DIMENSION CLPROB(9), AVAIL(9), ICAT(100), IDONE(100)
      COMMON/USECOM/ LUSE(10,100), IDUR(10,100), LASTUS(10,100),
     1 CONTIN(10,100)
      COMMON/DATE/ IYR
      COMMON/COLON/ LUPAT(10), CAPIT(10), CGOODS(10), AREACL(10),
     1 FAMLAB(10), MALES(10), FAMSIZ(10), CGOENT(10), CAPCON(10),
     2 MORTYP(10), IORIG(10), CGOCON(10), CAPENT(10)
      COMMON/VIRGCL/ IVCLFI
      COMMON/SIZES/ LOTS, NOPCHS, SIZLOT, SIZPCH
      COMMON/RANDOM/ INIT
      COMMON/WEEDS/ CONMAX
      COMMON/LOANS/ PCINT1(12), PCINT2(12), MONCOR(12), IPERIO(12),
     1 IGRACE(12), AMTPHA(12), MAFIME(12), MAFISD(12), IBEGYR(12),
     2 IENDYR(12)
      EXTERNAL IFINAN, ABAND
      IVCLFI = 0
      IF (LOT .EQ. 1 .AND. IPCH .EQ. 1) GO TO 202
      GO TO 203
  202 CONTINUE
      IF (IYR .GE. 2) GO TO 203
C     FOR FIRST CALL OF RUN
      READ (14, 1000) (CLPROB(IAGE),IAGE=1,9)
 1000 FORMAT(9F5.2)
C     ABOVE FORMAT 1000 FOR CLEARING PROBABILITIES BY CLEARING CLASS.
C     CLEARING CLASS CODES: 1=WEEDS OR BARE 2=2ND GTH .LT. 2 YRS.
C     3=2ND GTH 2-3 (INCL 3) YRS. 4=2ND GTH 4-6 YRS.  5=2ND GTH. 7-11 YR
C     6=2ND GTH 12-16 YRS  7=2ND GTH 17-20 YRS  8=2ND GTH OVER 20 YRS.
C     9=VIRGIN
C     PROBABILITIES FOR NON-VIRGIN CONDITIONS ARE
C     PROBABILITIES THAT A COLONIST WILL CLEAR SOME
C     OF THE CATEGORY GIVEN THAT THE CATEGORY IS PRESENT
      LASTLT = 0
  203 CONTINUE
      IF (LOT .NE. LASTLT) GO TO 200
      IF (IYR .NE. LASTYR) GO TO 200
      GO TO 205
  200 CONTINUE
C     FOR FIRST CALL FOR LOT AND YEAR
      DO 103 K=1,9
  103 AVAIL(K) = 0.
C     INITIALIZATION OF COUNTER FOR NUMBER OF
C     UNAVAILABLE PATCHES
      IUNAVA = 0
C     DETERMINATION OF AREA (PATCHES) AVAILABLE FOR EACH AGE CLASS
      DO 102 IP=1, NOPCHS
      ICAT(IP) = 0
      IDONE(IP) = 0
      IF (LASTUS(LOT, IP) .EQ. 1) GO TO 106
C     PLANTED ( PERENNIAL CROPS OR PASTURE) CONSIDERED UNAVAILABLE
      IF (LASTUS(LOT, IP) .EQ. 4 .OR. LASTUS(LOT, IP) .EQ. 5) GO TO 300
C     FOR ANNUAL CROPS AT END OF LAST YEAR
      IF (LASTUS(LOT, IP) .EQ. 3) GO TO 301
  302 CONTINUE
C     PATCHES IN CONTINUOUS "CULTIVATION" LONGER THAN
```

```
      C     THE MAXIMUM PERMISSIBLE PERIOD (MANDATED BY WEEDS)
      C     NOT CONSIDERED AVAILABLE FOR ALLOCATION TO CROPS
            IF (CONTIN(LOT, IP) .GE. (CONMAX * 365.25)) GO TO 300
            IF (IDUR(LOT, IP) .LT.  240) GO TO 108
            IF (IDUR(LOT, IP) .LT.  730) GO TO 110
            IF (IDUR(LOT, IP) .LT. 1096) GO TO 111
            IF (IDUR(LOT, IP) .LT. 2192) GO TO 112
            IF (IDUR(LOT, IP) .LT. 4018) GO TO 113
            IF (IDUR(LOT, IP) .LT. 5844) GO TO 114
            IF (IDUR(LOT, IP) .LT. 7305) GO TO 117
      C     FOR SECOND GROWTH OVER 20 YRS OLD (CATEGORY 8)
            ICAT(IP) = 8
            GO TO 116
        300 CONTINUE
      C     FOR PATCHES CONSIDERED UNAVAILABLE
            IDONE(IP) = 1
            IUNAVA = IUNAVA + 1
            IF (IUNAVA .LT. NOPCHS) GO TO 102
      C     PATCH NUMBER SET AT ZERO IF NONE AVAILABLE FOR CLEARING
            IPNO = 0
            GO TO 400
        301 CONTINUE
      C     FOR ANNUAL CROPS AT END OF LAST YEAR
      C     MANIOC CONSIDERED NOT USEABLE
            IF (LUSE(LOT, IP) .GE. 12) GO TO 300
      C     HARVEST OF OTHER ANNUAL CROPS
            IDUR(LOT, IP) = 0
            LUSE(LOT, IP) = 2
            GO TO 302
        106 CONTINUE
      C     FOR "NO CATEGORY" (VIRGIN + OTHER)
            IF (LUSE(LOT, IP) .EQ. 1) GO TO 115
            WRITE (6, 2000) LUSE(LOT, IP)
       2000 FORMAT(1X, 'ERROR: ITEM CODE "1" (NO CATEGORY) NOT FOR VIRGIN FOR
           1LAND USE CODE', I5, 2X, 'IN ICLEAR')
            CALL SYSTEM
        115 ICAT(IP) = 9
            GO TO 116
        108 CONTINUE
      C     FOR WEEDS OR BARE AT END OF PREV. AGRIC. YR.
            ICAT(IP) = 1
            GO TO 116
        110 CONTINUE
      C     FOR SECOND GROWTH  8 MONTHS (NOT INCL. 8TH MO.) TO 2 YRS.(INCL.2ND)
            ICAT(IP) = 2
            GO TO 116
        111 CONTINUE
      C     FOR SECOND GROWTH 2-3YRS OLD
            ICAT(IP) = 3
            GO TO 116
        112 CONTINUE
      C     FOR SECOND GROWTH  4-6 YRS. OLD
            ICAT(IP) = 4
            GO TO 116
        113 CONTINUE
      C     FOR SECOND GROWTH 7-11 YRS. OLD
            ICAT(IP) = 5
            GO TO 116
        114 CONTINUE
      C     FOR SECOND GROWTH 12-16 YRS. OLD
```

```
121           ICAT(IP) = 6
122           GO TO 116
123         117 CONTINUE
124       C     FOR SECOND GROWTH 17-20 YRS. OLD
125           ICAT(IP) = 7
126         116 CONTINUE
127           AVAIL(ICAT(IP)) = AVAIL(ICAT(IP)) + 1.
128         102 CONTINUE
129       C     DETERMINATION OF NUMBER OF PATCHES FINANCED FOR VIRGIN CLEARING
130           IVIRFI = IFINAN(LOT, 1, AVAIL(9), 2)
131         201 CONTINUE
132       C     SELECTION OF A RANDOM PATCH AS FIRST EXAMINED
133           XRAN = ABAND(INIT, -1.)
134           IPNO = IFIX(XRAN * (NOPCHS - 1) + 1)
135           IFIRST = IPNO
136           IROUND = 0
137         204 CONTINUE
138           IF (IDONE(IPNO) .EQ. 1) GO TO 205
139           IF (IVIRFI .GE. 1) GO TO 206
140       C     FOR PATCHES NOT INFLUENCED BY VIRGIN CLEARING
141       C     FINANCING:  CHOICE OF AGE CATEGORY (OF THOSE
142       C     AVAILABLE) TO BE CLEARED NEXT:
143       C     CHOSEN BY CLEARING PROBABILITIES.  IF NONE
144       C     SELECTED, THEN THE AVAILABLE PATCH WITH THE
145       C     HIGHEST CLEARING PROBABILITY IS SELECTED
146           CLPR = 0.
147           IPR = 0
148           ICATE = 0
149           DO 805 IC=1,9
150           IF (AVAIL(IC) .LE. 0.01) GO TO 805
151           XRAN = ABAND(INIT, -1.)
152           ICATE = IC
153           IF (CLPROB(IC) .GT. CLPR) IPR = IC
154           IF (XRAN .LT. CLPROB(IC)) GO TO 806
155         805 CONTINUE
156           ICATE = IPR
157         806 CONTINUE
158       C     FIND AN UNCLEARED PATCH OF THE CHOSEN CATEGORY
159           DO 807 IPC = 1,NOPCHS
160           IF (IDONE(IPC) .EQ. 1) GO TO 807
161           IF (ICAT(IPC) .EQ. ICATE) GO TO 207
162         807 CONTINUE
162.5         IF (ICATE .EQ. 0) GO TO 208
163           WRITE (6, 2002) ICATE
164        2002 FORMAT(1X, 'CLEARING CATEGORY ', I5, 2X,
165          1 'NOT RECOGNIZED IN ICLEAR')
166           CALL ERROR
167         207 IDONE(IPNO) = 1
168           AVAIL(ICAT(IPNO)) = AVAIL(ICAT(IPNO)) - 1.
169           GO TO 900
170         205 CONTINUE
171       C     FOR PATCHES WHICH HAVE ALREADY BEEN CLEARED (PREPARED)
172           IPNO = IPNO + 1
173           IF (IPNO .GT. NOPCHS) IROUND = IROUND + 1
174           IF (IPNO .GT. NOPCHS) IPNO = 1
175           IF (IROUND .GE. 3) GO TO 208
176           GO TO 204
177         208 CONTINUE
178       C     FOR CASES WHERE NO PATCHES ARE AVAILABLE
180           IPNO = 0
```

```
      IUNAVA = NOPCHS
      GO TO 400
  206 CONTINUE
C     FOR FINANCED VIRGIN CLEARING
C     FINDS A VIRGIN PATCH
      DO 209 IVPNO = 1, NOPCHS
      IF (IDONE(IVPNO) .EQ. 1) GO TO 209
      IF (ICAT(IVPNO) .NE. 9) GO TO 209
      ICLEAR = IVPNO
      IDONE(IVPNO) = 1
      IVIRFI = IVIRFI - 1
C     VIRGIN CLEARING INDICATOR FOR THIS
C     PATCH SET (0=NOT FINANCED 1=FINANCED)
      IVCLFI = 1
      AVAIL(9) = AVAIL(9) - 1.
C     CAPITAL TENTATIVELY INCREASED BY AMOUNT RECEIVED
C     FOR FINANCED CLEARING.  THIS WILL BE RESTORED IN LUALLO
C     IF THE PATCH IS NOT ACTUALLY ALLOCATED.  THE ACTUAL
C     LOAN WILL ALSO BE GRANTED IN LCALLO (THROUGH LOANG) IF
C     THE PATCH IS ALLOCATED.
      LOTY = 2
      IF (IYR .GE. IBEGYR(3)) LOTY = 3
      CAPIT(LOT) = CAPIT(LOT) + AMTPHA(LOTY) * SIZPCH
      GO TO 901
  209 CONTINUE
      WRITE (6, 2003) LOT, IPCH, IYR
 2003 FORMAT(1X, 'ERROR:  VIRGIN CLEARING FINANCING INDICATED',
     1 1X,'WHERE NO PATCHES AVAILABLE',/ 1X, 'IN ICLEAR',
     2 1X, '  LOT=', 1X, I5, 2X, 'PATCH=', 1X, I5, 2X, 'YEAR=', 2X,
     3 I5)
      CALL ERROR
  900 CONTINUE
  400 CONTINUE
      ICLEAR = IPNO
  901 CONTINUE
      LASTLT = LOT
      LASTYR = IYR
      RETURN
      END
END OF FILE
```

```
      CALL SYSTEM
  200 CONTINUE
C     TEST FOR TOTAL LABOR FEASIBILITY WITHOUT HIRED LABOR
      DO 300 MO = 1, 12
C     "MO" IS THE CALENDAR MONTH
      HIRLAB = 0.
      TENTAT(MO) = TENTAT(MO) - REQTL(MO, IOPER) * SIZPCH
      IF (TENTAT(MO) .LE. 0.) GO TO 201
      GO TO 301
  201 CONTINUE
C     TEST OF FEASIBILITY OF HIRING OUTSIDE LABOR IF FAMILY LABOR (TOTAL
C     LABOR) IS INADEQUATE FOR MONTH
      IF (TENCAP .GE. (COLAB(MO) * ABS(TENTAT(MO)))) GO TO 103
      GO TO 900
  103 CONTINUE
C     CASE OF FEASIBILITY ONLY WITH HIRED LABOR TO MEET REQUIREMENT FOR
C     TOTAL (IRRESPECTIVE OF SEX AND AGE) LABOR
      HIRLAB = HIRLAB + ABS(TENTAT(MO))
      TENCAP = TENCAP - COLAB(MO) * ABS(TENTAT(MO))
      TENTAT(MO) = 0.
  301 CONTINUE
C     TEST FOR MALE LABOR FEASIBILITY WITHOUT HIRED LABOR
      TENML(MO) = FLMALE(MO) + HIRLAB - REQML(MO, IOPER) * SIZPCH
      IF (TENML(MO) .LE. 0.) GO TO 302
      GO TO 303
  302 CONTINUE
C     TEST OF FEASIBILITY OF HIRING OUTSIDE LABOR IF FAMILY MALE LABOR
C     INADEQUATE FOR MONTH
      IF (TENCAP .GE. (COLAB(MO) * ABS(TENML(MO)))) GO TO 304
      GO TO 900
  304 CONTINUE
C     CASE OF FEASIBILITY WITH HIRED LABOR FOR MALE LABOR REQUIREMENT
      TENCAP = TENCAP - COLAB(MO) * ABS(TENML(MO))
      HIRLAB = HIRLAB + ABS(TENML(MO))
      TENML(MO) = 0.
  303 CONTINUE
C     TEST FOR FIXED CAPITAL COST FEASIBILITY
      TENCAP = TENCAP - REQFC(MO, IOPER) * SIZPCH
      IF (TENCAP .LT. -0.01) GO TO 900
  300 CONTINUE
C     RETURN FOR SECOND ROUND FOR NON-CLEARING LABOR AND CAPITAL
C     FEASIBILITY CHECKS  (THE CLEARING WAS DONE IN THE FIRST
C     ROUND;  THE PLANTING AND HARVESTING IN THE SECOND.)
      IF (IOPER .LE. 3) GO TO 501
      CAPIT(LOT) = TENCAP
      DO 202 IM = 1, 12
C      "IM" IS THE CALENDAR MONTH
      FLMALE(IM) = TENML(IM)
  202 FLTOT(IM) = TENTAT(IM)
      LABOR = 1
  900 CONTINUE
C     LAST LOT INDICATOR
      LASTLT = LOT
      RETURN
      END
END OF FILE
```

```
      CALL SYSTEM
  200 CONTINUE
C     TEST FOR TOTAL LABOR FEASIBILITY WITHOUT HIRED LABOR
      DO 300 MO = 1, 12
C     "MO" IS THE CALENDAR MONTH
      HIRLAB = 0.
      TENTAT(MO) = TENTAT(MO) - REQTL(MO, IOPER) * SIZPCH
      IF (TENTAT(MO) .LE. 0.) GO TO 201
      GO TO 301
  201 CONTINUE
C     TEST OF FEASIBILITY OF HIRING OUTSIDE LABOR IF FAMILY LABOR (TOTAL
C     LABOR) IS INADEQUATE FOR MONTH
      IF (TENCAP .GE. (COLAB(MO) * ABS(TENTAT(MO)))) GO TO 103
      GO TO 900
  103 CONTINUE
C     CASE OF FEASIBILITY ONLY WITH HIRED LABOR TO MEET REQUIREMENT FOR
C     TOTAL (IRRESPECTIVE OF SEX AND AGE) LABOR
      HIRLAB = HIRLAB + ABS(TENTAT(MO))
      TENCAP = TENCAP - COLAB(MO) * ABS(TENTAT(MO))
      TENTAT(MO) = 0.
  301 CONTINUE
C     TEST FOR MALE LABOR FEASIBILITY WITHOUT HIRED LABOR
      TENML(MO) = FLMALE(MO) + HIRLAB - REQML(MO, IOPER) * SIZPCH
      IF (TENML(MO) .LE. 0.) GO TO 302
      GO TO 303
  302 CONTINUE
C     TEST OF FEASIBILITY OF HIRING OUTSIDE LABOR IF FAMILY MALE LABOR
C     INADEQUATE FOR MONTH
      IF (TENCAP .GE. (COLAB(MO) * ABS(TENML(MO)))) GO TO 304
      GO TO 900
  304 CONTINUE
C     CASE OF FEASIBILITY WITH HIRED LABOR FOR MALE LABOR REQUIREMENT
      TENCAP = TENCAP - COLAB(MO) * ABS(TENML(MO))
      HIRLAB = HIRLAB + ABS(TENML(MO))
      TENML(MO) = 0.
  303 CONTINUE
C     TEST FOR FIXED CAPITAL COST FEASIBILITY
      TENCAP = TENCAP - REQFC(MO, IOPER) * SIZPCH
      IF (TENCAP .LT. -0.01) GO TO 900
  300 CONTINUE
C     RETURN FOR SECOND ROUND FOR NON-CLEARING LABOR AND CAPITAL
C     FEASIBILITY CHECKS  (THE CLEARING WAS DONE IN THE FIRST
C     ROUND;  THE PLANTING AND HARVESTING IN THE SECOND.)
      IF (IOPER .LE. 3) GO TO 501
      CAPIT(LOT) = TENCAP
      DO 202 IM = 1, 12
C      "IM" IS THE CALENDAR MONTH
      FLMALE(IM) = TENML(IM)
  202 FLTOT(IM) = TENTAT(IM)
      LABOR = 1
  900 CONTINUE
C     LAST LOT INDICATOR
      LASTLT = LOT
      RETURN
      END
END OF FILE
```

IDAGYR

Purpose:	day of the agricultural year given the day of the month and the calendar month (agricultural year is July 1 - June 30).
Kind of routine:	function (integer)
Arguments:	IDOM day of month ICALMO calendar month
COMMON areas:	DATE
Routines called:	IDAYYR
Routine called by:	USETOT, VBQ, SGBQ
Program size:	402 bytes

```
      1            FUNCTION IDAGYR(IDCM, ICALMO)
      2      C     DAY OF AGRICULTURAL YEAR FUNCTION: RETURNS DAY OF AGRIC. YR. GIVEN
      3      C     DAY OF MONTH AND CALENDAR MONTH
      4            COMMON/DATE/ IYR
      5            EXTERNAL IDAYYR
      6            IAGMO = ICALMO - 6
      7            IF (ICALMO .GE. 7) GO TO 200
      8            IAGMO = ICALMO + 6
      9        200 IDAGYR = IDAYYR(IDCM, IAGMO, IYR)
     10            RETURN
     11            END
END OF FILE
```

LEARN

Purpose:	learning in land use allocation behavior: updates expected yields used in SUBSIS subroutine to reflect experience in area
Kind of routine:	subroutine
Arguments:	LOT lot number LUCOD land use code (for single crop) (see codes section) yield yield of the crop in kg/ha/year
COMMON areas:	DATE, EXPECT
Routines called:	none
Routine called by:	LOTPRO
Program size:	882 bytes

```
      1            SUBROUTINE LEARN(LOT, LUCOD, YIELD)
      2      C     UPDATES AREA-WIDE EXPECTED YIELD STATISTICS FOR USE IN LEARNING
      3      C     FEATURE OF SUBSIS SUBROUTINE
      4      C
      5            COMMON/DATE/ IYR
      6            COMMON/EXPECT/ EYSUM(6), EYNUM(6), EYSSQ(6)
      7            IF (LOT .EQ. 1 .AND. IYR .EQ. 1) GO TO 900
      8            IC = 0
      9      C     "LUCOD" VALUES ARE LAND USE CODES;  "IC" VALUES ARE
     10      C     USEPR CROP CODES
     11            IF (LUCOD .EQ. 5) IC = 1
     12            IF (LUCOD .EQ. 7) IC = 2
     13            IF (LUCOD .EQ. 8) IC = 3
     14            IF (LUCOD .EQ.10 .OR. LUCOD .EQ. 11) IC = 4
     15            IF (LUCOD .GE. 12 .AND. LUCOD .LE. 15) IC = 5
     16            IF (LUCOD .EQ.16 .OR. LUCOD .EQ. 17) IC = 6
     17            IF (LUCOD .EQ.22 .OR. LUCOD .EQ. 24) IC = 6
     18            IF (IC .EQ. 0) GO TO 900
     19            EYSUM(IC) = EYSUM(IC) + YIELD
     20            EYSSQ(IC) = EYSSQ(IC) + YIELD * YIELD
     21            EYNUM(IC) = EYNUM(IC) + 1.
     22        900 CONTINUE
     23            RETURN
     24            END
END OF FILE
```

IDAYYR

Purpose:	day of the agricultural year given the day of the month and the agricultural month (agricultural year is July 1 - June 30).
Kind of routine:	function (integer)
Arguments:	IDOM day of the month IDAGRMO agricultural month IAGRYR agricultural year
COMMON areas:	none
Routines called:	NDAYS
Routine called by:	IDAGYR
Program size:	506 bytes

LEAVE

Purpose:	colonist turnover: family unit emmigration (as opposed to emmigration of individuals)
Kind of routine:	subroutine
Arguments:	LOT lot number
	IFREEZ code for frozen population sector (1=frozen, 2=dynamic)
COMMON areas:	RANDOM, COLON, POP, FIN, GAME, WAGELA
Routines called:	POPGEN, ARAND
Routine called by:	MAIN
Program size:	802 bytes

```
      1            FUNCTION IDAYYR(IDOM, IAGRMC, IAGRYR)
      2      C     DAY OF YEAR FUNCTION WHICH RETURNS THE DAY OF THE AGRICULTURAL
      3      C     YEAR (JULY 1 - JUNE 30) GIVEN THE DAY OF THE MONTH, AGRICULTURAL
      4      C     MONTH (JULY = 1) AND AGRICULTURAL YEAR.
      5      C
      6      C     CALCULATION OF CALENDAR MONTH
      7            EXTERNAL NDAYS
      8            ICALMC = IAGRMC - 6
      9            IF (IAGRMO .LT. 7) ICALMO = IAGRMC + 6
     10      C     CALCULATION OF PRESENT CALENDAR YEAR
     11            ICYPRE = IAGRYR
     12            IF (IAGRMO .GT. 6) ICYPRE = IAGRYR + 1
     13            IDAYYR = NDAYS(IDOM, ICALMO, ICYPRE) - NDAYS(1, 7, IAGRYR)
     14            RETURN
     15            END
     16            FUNCTION NDAYS(IDA, ICALMO, ICALYR)
     17      C     NUMBER OF DAYS FUNCTION WHICH RETURNS THE NUMBER OF ELAPSED
     18      C     DAYS SINCE CALENDAR DAY=1, MONTH=1 AND YEAR=1 (JAN-DEC CALENDAR)
     19            K1 = 365 * ICALYR + ICALYR / 4
     20            C = 30.6 * FLOAT(ICALMC) - 32.3
     21            IF (ICALMO .GE. 3) GO TO 5
     22            IF (MOD(ICALYR, 4) .EQ. 0) K1 = K1 - 1
     23            C = C + 2.3
     24          5 NDAYS =  K1 + INT(C) + IDA  - 365
     25            RETURN
     26            END
END OF FILE
```

```
      1            SUBROUTINE LEAVE(LOT, IFREEZ)
      2      C     FAMILY UNIT EMMIGRATION SUBROUTINE
      3            COMMON/RANDOM/ INIT
      4            COMMON/COLON/ LUPAT(1), CAPIT(1), CGOODS(1), AREACL(1),
      5           1 FAMLAB(1), MALES(1), FAMSIZ(1), CGOENT(1), CAPCON(1),
      6           2 MORTYP(1), IORIG(1), CGOCON(1), CAPENT(1)
      7            COMMON/POP/ MALE(1, 86), IFEM(1, 86), FAMSTR(10, 2), PDEP(86,2),
      8           1  FLEQUI(2, 5), PDEATH(2, 86), PINDEM(2, 86),
      9           2 PINDIM, PBIRTH(44), CALAGE(8), PROAGE(19), MARIT(1),
     10           3 PMARRY, AGBRME, AGBRSD, PMIMIG, PRIMAG(2, 86),CALREQ(25),
     11           4 PROREQ(8)
     12            COMMON/FIN/ ISOLV(1), DUEPRI(20), DUEINT(20), AMTLO(1, 20),
     13           1 LOANDA(1, 20), LOANTY(1, 20), MAXNLO, RAINFL
     14            COMMON/GAME/ SMEAT, IHUNT(1), FHUNT, IENDHU, EFFORT(12), YLDSLO,
     15           1 YLDINT, EFFSLO, EFFINT, GWASTE
     16            COMMON/WAGELA/ LABPAT(1), PTYLAB(4, 4), TOLAME(4), TOLASD(4),
     17           1 RMLAME(4), RMLASD(4), EARNME(4), EARNSD(4), PLEAVE(2, 4)
     18            EXTERNAL ARAND
     19      C     DETERMINATION OF COLONIST LEAVING GIVEN MARITAL STATUS AND MORAN
     20      C     TYPE
     21            XRAN = ARAND(INIT, -1.)
     22            IF (XRAN .GE. PLEAVE(MARIT(LOT), MORTYP(LOT))) GO TO 900
     23      C     INITIALIZATIONS FOR NEW LOT OWNER
     24            LUPAT(LOT) = 0
     25            CAPIT(LOT) = 0.
     26            CGOODS(LOT) = 0.
     27            FAMLAB(LOT) = 0.
     28            MALES(LOT) = 0
     29            FAMSIZ(LOT) = 0.
     30            CGOENT(LOT) = 0.
     31            MORTYP(LOT) = 0
     32            IORIG(LOT) = 2
     33            CGOCON(LOT) = 0.
     34            CAPENT(LOT) = 0.
     35            ISOLV(LOT) = 1
     36            DO 100 LONO = 1, MAXNLO
     37      C     NOTE THAT NEWCOMER COLONISTS START WITH NO DEBTS
     38            AMTLO(LOT, LONO) = 0.
     39            LOANDA(LOT, LONO) = 0
     40        100 LOANTY(LOT, LONO) = 0
     41            IHUNT(LOT) = 0
     42            LABPAT(LOT) = 0
     43      C     GENERATION OF NEW IMMIGRANT'S FAMILY COMPOSITION
     44            CALL POPGEN(LOT, IFREEZ)
     45        900 CONTINUE
     46            RETURN
     47            END
END OF FILE
```

LOANG

Purpose:	loan granting: adjusts capital and debts when loans are granted.
Kind of routine:	subroutine
Arguments:	LOT lot number LOTYPE loan type LGCALL loan grant call code (0=not previously called: for granting one-time loans, 2=previously called)
COMMON areas:	SIZES, FIN, LOANS, DATE, FLAB, FICOST, FINPCH, COLON
Routines called:	BRAND
Routine called by:	BUFFER, IFINAN, LUALLO, MAIN
Program size:	2414 bytes

```
      SUBROUTINE LOANG(LOT, LOTYPE, LGCALL)
      IF (LGCALL .EQ. 0) GO TO 104
C     LOAN GRANTING SUBROUTINE. MAKES ADJUSTMENTS IN CAPITAL FOR
C     FELLING, CUSTEIO, "TREE" CROPS AND CATTLE LOANS. BANK AND INCRA
C     DEBTS ARE ADJUSTED FOR ALL LOAN TYPES.
      DOUBLE PRECISION BRAND
      COMMON/FLAB/ FLTOT(12), FLMALE(12), LABCAL
      COMMON/FICOST/FINLSD, FINLME, FICOSD, FICOME, PRFINL(12)
      COMMON/SIZES/ LOTS, NOPCHS, SIZLOT, SIZPCH
      COMMON/FIN/ ISOLV(10), DUEPRI(20), DUEINT(20), AMTLO(10, 20),
     1 LOANDA(10, 20), LCANTY(10, 20), MAXNLO, RAINFL
      COMMON/FINPCH/ FINPC
      COMMON/LOANS/ PCINT1(12), PCINT2(12), MONCOR(12), IPERIO(12),
     1 IGRACE(12), AMTPHA(12), HAFIME(12), HAFISD(12), IBEGYR(12),
     2 IENDYR(12)
      COMMON/COLON/ LUPAT(10), CAPIT(10), CGOODS(10), AREACL(10),
     1 FAMLAB(10), MALES(10), FAMSIZ(10), CGOENT(10), CAPCON(10),
     2 MORTYP(10), IORIG(10), CGOCON(10), CAPENT(10)
      COMMON/DATE/ IYR
      EXTERNAL ARAND
C     FOR VIRGIN FELLING LOANS THE APPROPRIATE LOAN TYPE (2 OR 3) IS
C     SELECTED DEPENDING ON THE DATE
      IF (LOTYPE .EQ. 2 .OR. LOTYPE .EQ. 3) GO TO 500
      GO TO 501
  500 IF (IYR .GE. IBEGYR(2) .AND. IYR .LE. IENDYR(2)) LOTYPE = 2
      IF (IYR .GE. IBEGYR(3) .AND. IYR .LE. IENDYR(3)) LOTYPE = 3
  501 CONTINUE
      UNIT = SIZPCH
C     NOTE: FOR FOLLOWING ONE-TIME LOANS NOT RELATED TO AREA THE
C     "AMOUNT PER HECTARE"  REFER TO VALUE IN 1975 CRUZEIROS,
C     WHILE "HECTARES FINANCED" HAS BEEN SET AT 1.
      IF (LOTYPE .EQ. 1 .OR. LOTYPE .EQ. 4) GO TO 200
      IF (LOTYPE .EQ. 5 .OR. LOTYPE .EQ.11) GO TO 200
      IF (LOTYPE .EQ. 12) GO TO 200
      GO TO 201
  200 UNIT = SNGL(BRAND(DBLE(HAFISD(LOTYPE)), DBLE(HAFIME(LOTYPE))))
      IF (UNIT .LE. 0.) UNIT = 0.
  201 LNFREE = 0
      DO 100 LONO = 1, MAXNLO
      IF (LCANTY(LOT, LONO) .EQ. 0) GO TO 101
      IF (LOANDA(LOT, LONO) .LT. IYR) GO TO 100
      IF (LOANTY(LOT, LONO) .EQ. LOTYPE) GO TO 102
      GO TO 100
  101 CONTINUE
      IF (LNFREE .EQ. 0) LNFREE = LONO
  100 CONTINUE
      IF (LNFREE .EQ. 0) GO TO 103
C     FOR NEW LOANS
      AMTLO (LOT, LNFREE) = AMTPHA(LOTYPE) * UNIT
      LOANDA(LOT, LNFREE) = IYR
      LOANTY(LOT, LNFREE) = LOTYPE
C     LOANS AT SETTLEMENT (HOUSE AND LAND, INCRA DEBT,
C     DURABLE GOODS) HAVE NO LABOR OR CASH COST
      IF (LOANTY(LOT, LNFREE) .EQ. 1) GO TO 900
      IF (LOANTY(LOT, LNFREE) .EQ. 4 ) GO TO 104
      IF (LOANTY(LOT, LNFREE) .EQ. 5 ) GO TO 104
      IF (LOANTY(LOT, LNFREE) .EQ. 12) GO TO 104
      IF (LGCALL .EQ. 1) GO TO 851
      GO TO 852
C     FOLLOWING ADJUSTS LABOR AND CASH FOR TIME AND MONEY
```

IFINAN

Purpose:	financing: returns the number of patches financed.
Kind of routine:	function (integer)
Arguments:	LOT lot number
	IOPER operation code (LABOR codes)
	AVAIL number of patches available for allocation (a REAL number)
	LOTYP loan type (BANK codes)
COMMON areas:	LOANS, DATE, SIZES, COLON, FIN, FPROBS, FINPCH
Routines called:	LOANG, BRAND
Routine called by:	ICLEAR, LUALLO, SEEDS
Program size:	1270 bytes

```
      FUNCTION IFINAN(LOT, IOPER, AVAIL, LOTYP)
C     FINANCING FUNCTION: RETURNS NUMBER OF PATCHES FINANCED.
C     ARGUMENTS: LOT, OPERATION CODE (SAME AS LABOR OPERATION CODES),
C     NUMBER OF PATCHES AVAILABLE FOR ALLOCATION (A REAL NO.), AND
C     LOAN TYPE (SAME AS CODES IN BANK).
      DOUBLE PRECISION BRAND
      COMMON/LOANS/ PCINT1(12), PCINT2(12), MONCOR(12), IPERIO(12),
     1 IGRACE(12), AMTPHA(12), HAFIME(12), HAFISD(12), IBEGYR(12),
     2 IENDYR(12)
      COMMON/DATE/ IYR
      COMMON/EPROBS/ PREIN(12)
      COMMON/SIZES/ LOTS, NOPCHS, SIZLOT, SIZPCH
      COMMON/COLON/ LUPAT(10), CAPIT(10), CGOODS(10), AREACL(10),
     1 FAMLAB(10), MALES(10), FAMSIZ(10), CGCENT(10), CAPCON(10),
     2 MORTYP(10), IORIG(10), CGOCON(10), CAPENT(10)
      COMMON/FIN/ ISOLV(10), DUEPRI(20), DUEINT(20), AMTLO(10, 20),
     1 LOANDA(10, 20), LOANTY(10, 20), MAXNLO, RAINFL
      COMMON/FINPCH/ FINPC
      EXTERNAL BRAND
      IFINAN = 0
C     CHECK TO SEE THAT LOANS OF THIS TYPE ARE AVAILABLE
C     IN THE YEAR OF THE REQUEST.
      IF (IYR .GE. IBEGYR(LOTYP) .AND. IYR .LE.
     1 IENDYR(LOTYP)) GO TO 301
      IF (LOTYP .EQ. 2 .AND. IYR .LE. IENDYR(3)) GO TO 301
      GO TO 900
  301 CONTINUE
C     SEEDS FROM INCRA AVAILABLE TO BOTH SOLVENT AND INSOLVENT COLONISTS
      IF (LOTYP .EQ. 6) GO TO 300
C     INSOLVENT COLONISTS DENIED OTHER TYPES OF FINANCING
      IF (ISOLV(LOT) .EQ. 2) GO TO 900
  300 CONTINUE
C     CHECK FOR EXCEEDING MAXIMU  ALLOWABLE NUMBER OF LOANS OF DIFFERENT
C     YEARS AND/OR TYPES
      DO 200 LONO = 1, MAXNLO
      IF (LOANTY(LOT, LONO) .LE. 0) GO TO 201
      IF (LOANDA(LOT, LONO) .LT. IYR) GO TO 200
      IF (LOANTY(LOT, LONO) .EQ. LOTYP) GO TO 201
  200 CONTINUE
      GO TO 900
  201 CONTINUE
      ISEED = 1
      LOANT = LOTYP
      IF (LOTYP .EQ. 6) GO TO 202
      GO TO 203
  202 CONTINUE
C     INCRA FINANCED SEEDS (FOR RICE, MAIZE AND PHASEOLUS) - AREA
C     COMPUTED AS BANK OF BRASIL  FINANCED AREA DISTRIBUTION FOR CROP
      LOANT = IOPER + 3
      ISEED = 2
  203 AREA = SNGL(BRAND(DBLE(HAFISD(LOANT)),
     1 DBLE(HAFIME(LOANT))))
      IF (AREA .LE. 0.) AREA = 0.
      IFINAN = IFIX(AREA / SIZPCH)
      IF (IFINAN .GT. IFIX(AVAIL)) IFINAN =IFIX(AVAIL)
      IF (ISEED .EQ. 1) GO TO 900
      IF (IFINAN .LE. 0) GO TO 900
C     GRANTING OF INCRA FINANCED SEED LOANS
      IFIN = IFINAN
      DO 204 IP = 1, IFIN
```

```
      204 CALL LOANG(LOT, 6, 0)
      900 CONTINUE
C         NUMBER OF PATCHES FINANCED SAVED FOR USE IN LOANG FOR
C         INSTALLMENT DEDUCTION OF FINANCING COSTS
          FINPC = FLOAT(IFINAN)
          RETURN
          END
END OF FILE
```

INITSQ

Purpose:	initial soil quality generation: uses transition probabilities between different fertility classes with moves between lots and between patches within a lot to simulate the patchiness of soil qualities found in nature. Correlations between the levels of different nutrients found in nature are maintained in the simulated soil qualities.
Kind of routine:	subroutine
Arguments:	LOT lot number IPCH patch number
COMMON areas	SOIL, HISTOR, MATRIX, RANDOM
Routines called:	ARAND, BRAND
Routine called by:	MAIN
Program size:	5688 bytes

```
      SUBROUTINE INITSQ(LOT, IPCH)
      REAL*8 DLOG
      DOUBLE PRECISION BRAND
      DOUBLE PRECISION PHOS, PH, AL, NITRO, CARB, CLAY, SLOPE
      COMMON/SOIL/ PHOS(10,100), PH(10,100), AL(10,100),
     1 NITRO(10,100), CARB(10,100), CLAY(10,100), SLOPE(10,100)
      COMMON/HISTOR/ VIRGSO(10,100)
      COMMON/MATRIX/ PROB(7, 7, 2)
      COMMON/RANDOM/ INIT
      EXTERNAL ARAND, BRAND
C     INITIALIZATION OF VIRGIN SOIL INDICATIOR (FOR PHASEOLUS DISEASE
C     PROBABILITY CALCULATION)
      VIRGSO(LOT, IPCH) = 1
      IF (LOT .EQ. 1 .AND. IPCH .EQ. 1) GO TO 101
C     FOLLOWING FOR CALLS NOT THE FIRST CALL FOR RUN
      IDIST = 1
C     DISTANCE MOVED OF 100 METERS CODED 1 ; 500 METERS CODED 2
      IF (IPCH  .EQ. 1) IDIST = 2
C     ASSIGNMENT OF PREVIOUS PATCH AND LOT
      IPVP = IPCH - 1
      IPVL = LOT
      IF (IPCH .GE. 2) GO TO 300
      IPVL = LOT - 1
      IPVP = 1
  300 CONTINUE
C     ASSIGNMENT OF PH CLASS
      IF (PH(IPVL, IPVP) .LT. 4.) IPHCL = 1
      IF (PH(IPVL, IPVP) .GE. 4. .AND. PH(IPVL,IPVP).LT.4.5)IPHCL=2
      IF (PH(IPVL, IPVP) .GE.4.5 .AND. PH(IPVL,IPVP).LT.5.0)IPHCL=3
      IF (PH(IPVL, IPVP) .GE.5.0 .AND. PH(IPVL,IPVP).LT.5.5)IPHCL=4
      IF (PH(IPVL, IPVP) .GE.5.5 .AND. PH(IPVL,IPVP).LT.6.0)IPHCL=5
      IF (PH(IPVL, IPVP) .GE.6.0 .AND. PH(IPVL,IPVP).LT.6.5)IPHCL=6
      IF (PH(IPVL, IPVP) .GE. 6.5) IPHCL = 7
      XRAN = ARAND(INIT, -1.)
      IF (XRAN .LT. PROB(1, IPHCL, IDIST)) GO TO 11
      P2 = PROB(1, IPHCL, IDIST) + PROB(2, IPHCL, IDIST)
      IF (XRAN .GE. PROB(1, IPHCL, IDIST) .AND. XRAN .LT. P2)GO TO 12
      P3 = P2 + PROB(3, IPHCL, IDIST)
      P4 = P3 + PROB(4, IPHCL, IDIST)
      P5 = P4 + PROB(5, IPHCL, IDIST)
      P6 = P5 + PROB(6, IPHCL, IDIST)
      IF (XRAN .GE. P2 .AND. XRAN .LT. P3) GO TO 13
      IF (XRAN .GE. P3 .AND. XRAN .LT. P4) GO TO 14
      IF (XRAN .GE. P4 .AND. XRAN .LT. P5) GO TO 15
      IF (XRAN .GE. P5 .AND. XRAN .LT. P6) GO TO 16
      GO TO 17
  101 CONTINUE
C     FOLLOWING FOR CASE OF FIRST CALL OF RUN
      XRAN = ABLND(INIT, -1.)
      IF (XRAN .LT. 0.330) GO TO 11
      IF (XRAN .LT. 0.632) GO TO 12
      IF (XRAN .LT. 0.785) GO TO 13
      IF (XRAN .LT. 0.910) GO TO 14
      IF (XRAN .LT. 0.963) GO TO 15
      IF (XRAN .LT. 0.999) GO TO 16
      GO TO 17
   11 CONTINUE
C     FOR PH CLASS 1 (PH < 4.0)
      PH(LOT, IPCH) = BRAND(1.0D-1, 3.7D0)
      GO TO 102
```

```
      12 CONTINUE
C       FOR PH CLASS 2 (PH 4.0 - 4.4)
        PH(LOT, IPCH) = BRAND(1.0D-1, 4.1D0)
        GO TO 102
      13 CONTINUE
C       FOR PH CLASS 3 (4.5 - 4.9)
        PH(LOT, IPCH) = BRAND(1.0D-1, 4.7D0)
        GO TO 102
      14 CONTINUE
C       FOR PH CLASS 4 ( PH 5.0 - 5.4)
        PH(LOT, IPCH) = BRAND(1.0D-1, 5.2D0)
        GO TO 102
      15 CONTINUE
C       FOR PH CLASS 5  (PH 5.5 - 5.9)
        PH(LOT, IPCH) = BRAND(1.0D-1, 5.6D0)
        GO TO 102
      16 CONTINUE
C       FOR PH CLASS 6  (PH 6.0 - 6.4)
        PH(LOT, IPCH) = BRAND(1.0D-1, 6.3D0)
        GO TO 102
      17 CONTINUE
C       FOR PH CLASS 7 (PH 6.5 UP)
        PH(LOT, IPCH) = 7.1
    102 CONTINUE
C       CLAY ASSIGNMENT
        XRAN = ARAND(INIT, -1.)
        IF (XRAN .LT. 0.216) CLAY(LOT, IPCH)=BRAND(2.83D0, 9.71D0)
        IF (XRAN .GE. 0.216.AND.XRAN.LT.0.469)CLAY(LOT,IPCH)=BRAND(4.05D0,
       1 2.17D1)
        IF(XRAN.GE.0.469.AND.XRAN.LT. 0.705) CLAY(LOT, IPCH) =
       1 BRAND(4.48D0, 3.795D1)
        IF (XRAN .GE. 0.705 .AND. XRAN .LT. 0.917) CLAY(LOT, IPCH) =
       1 BRAND(4.0JD0, 5.00D1)
        IF (XRAN .GE. 0.917 .AND. XRAN .LT. 0.992) CLAY(LOT, IPCH) =
       1 BRAND(3.57D0, 6.972D1)
        IF (XRAN .GE. 0.992) CLAY(LOT, IPCH) = BRAND(1.03D0, 7.88D1)
C       SLOPE ASSIGNMENT
        XRAN = ARAND(INIT, -1.)
        IF (XRAN .LT. 0.320) SLOPE(LOT, IPCH) = BRAND(1.4D0, 2.0D0)
        IF (XRAN .GE. 0.320 .AND. XRAN .LT. 0.507) SLOPE(LOT, IPCH) =
       1 BRAND(1.3D0, 6.3D0)
        IF (XRAN .GE. 0.507 .AND. XRAN .LT. 0.800) SLOPE(LOT, IPCH) =
       1 BRAND(2.5D0, 1.38D1)
        IF (XRAN .GE. 0.800 .AND. XRAN .LT. 0.935) SLOPE(LOT, IPCH) =
       1 BRAND(2.2D0, 2.28D1)
        IF (XRAN .GE. 0.935 .AND. XRAN .LT. 0.993) SLOPE(LOT, IPCH) =
       1 BRAND(2.9D0, 3.78D1)
        IF (XRAN .GE. 0.993 .AND. XRAN .LT. 0.999) SLOPE(LOT, IPCH) =
       1 BRAND(3.3D0, 5.79D1)
        IF (XRAN .GE. 0.999) SLOPE(LOT, IPCH) = 89.0
        IF (SLOPE(LOT, IPCH) .LE. 0.) SLOPE(LOT, IPCH) = 0.
C       ALUMINUM ASSIGNMENT
        ALMEAN = 11.43 - 7.68 * DLOG(PH(LOT, IPCH)) - 6.27D-2 * CLAY(LOT,
       1 IPCH)
        AL(LOT, IPCH) = BRAND(1.56D0, DBLE(ALMEAN))
C       CARBON ASSIGNMENT
        XRAN = ARAND(INIT, -1.)
        IF (XRAN .LT. 0.019) CARB(LOT, IPCH) = BRAND(8.0D-2, 3.9D-1)
        IF (XRAN .GE.0.019.AND.XRAN.LT.0.329)CARB(LOT,IPCH)=
       1 BRAND(1.1D-1, 7.0D-1)
```

```
  121            IF(XRAN.GE.0.329.AND.XRAN.LT.0.380)CARB(LOT,IPCH)=
  122           1 BRAND(3.0D-2, 9.4D-1)
  123            IF(XRAN.GE.0.380.AND.XRAN.LT.0.788)CARB(LOT,IPCH)=
  124           1 BRAND(1.3D-1, 1.18D0)
  125            IF(XRAN.GE.0.788) CARB(LOT, IPCH) = BRAND(1.4D-1, 1.70D0)
  126      C     PHOSPHORUS ASSIGNMENT
  127            XRAN = ARAND(INIT, -1.)
  128            IF (XRAN .LT. 0.838) PHOS(LOT, IPCH) = 1.0
  129            IF(XRAN.GE.0.838.AND.XRAN.LT.0.921)PHOS(LOT,IPCH)=2.0
  130            IF(XRAN.GE.0.921.AND.XRAN.LT.0.978)PHOS(LOT,IPCH)=
  131           1 BRAND(1.0D-1, 3.0D0)
  132            IF(XRAN.GE.0.978.AND.XRAN.LT.0.999)PHOS(LOT,IPCH)=
  133           1 BRAND(4.0D-1, 5.2D0)
  134            IF(XRAN.GE.0.999) PHOS(LOT, IPCH) = 7.0
  135      C     NITROGEN ASSIGNMENT
  136            RNITME = 0.132 * CARB(LOT, IPCH) + 2.20D-2 * PH(LOT, IPCH) - 0.120
  137            NITRO(LOT, IPCH) = BRAND(3.0D-2, DBLE(RNITME))
  138            IF (PH(LOT,IPCH).LT. 1.) PH(LOT, IPCH) = 1.
  139            IF (AL(LOT,IPCH).LT. 0.) AL(LOT, IPCH) = 0.
  140            IF (PHOS(LOT, IPCH) .LT. 0.1) PHOS(LOT, IPCH) = 0.1
  141            IF (NITRO(LOT,IPCH) .LT. 0.0) NITRO(LOT,IPCH) = 0.0
  142            IF (CARB(LOT, IPCH) .LT. 0.0) CARB(LOT, IPCH) = 0.0
  143            RETURN
  144            END
END OF FILE
```

ITPORT

Purpose:	transport availability: returns 1 if transport to market is available and 2 if not available. Uses separate probabilities for 3 zones and 2 time periods.
Kind of routine:	function (integer)
Arguments:	LOT lot number
COMMON areas:	DATE, RANDOM, TRANSP
Routines called:	ARAND
Routine called by:	PRALLO
Program size:	700 bytes

```
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 0001               FUNCTION ITPORT(LOT)
             C      TRANSPORT FUNCTION: RETURNS 1 IF ADEQUATE TRANSPORT TO MARKET
             C      AVAILABLE; RETURNS 2 IF UNAVAILABLE.
             C      PROVIDES SEPARATE PROBABILITIES FOR 3 ZONES: 1=MAIN ROAD LOTS,
             C      2=TRAVESSAO BEFORE INTERIOR AGROVILA, 3=TRAVESSAO AFTER AGROVILA,
             C      AND TWO TIME PERIODS.
 0002               DIMENSION IZONE(10)
             C      ABOVE DIMENSIONED AT NO. OF LOTS
 0003               COMMON/DATE/ IYR
 0004               COMMON/RANDOM/ INIT
 0005               COMMON/TRANSP/ PRNOTR(3, 2), IYRTPT, PRZONE(3)
 0006               EXTERNAL ARAND
 0007               IF (IYR .GE. 2) GO TO 100
             C      FOR FIRST YEAR CALLS: ASSIGNMENT OF ZONES
 0008               XRAN = ARAND(INIT, -1.)
 0009               IZONE(LOT) = 3
 0010               IF (XRAN .LT. PRZONE(1)) IZONE(LOT) = 1
 0011               PCUM = PRZONE(1) + PRZONE(2)
 0012               IF (XRAN .GE. PRZONE(1) .AND. XRAN .LT. PCUM) IZONE(LOT) = 2
 0013           100 CONTINUE
             C      ASSIGNMENT OF TIME PERIOD
 0014               ITIME = 1
 0015               IF (IYR .GE. IYRTPT) ITIME = 2
             C      DETERMINATION OF PRESENCE OF ADEQUATE TRANSPORT
 0016               ITPORT = 1
 0017               XRAN = ARAND(INIT, -1.)
 0018               IF (XRAN .LT. PRNOTR(IZONE(LOT), ITIME)) ITPORT = 2
 0019               RETURN
 0020               END
```

LABEQU

Purpose:	labor equivalents for calculating family labor availability based on ages and sexes of members
Kind of routine:	subroutine
Arguments:	LOT lot number
COMMON areas	COLON, POP
Routines called:	none
Routine called by:	LUALLO
Program size:	946 bytes

```
MICHIGAN TERMINAL SYSTEM FORTRAN G(21.8  TEST)        LABFQU          12-03-77         09:54:25        PAGE P001
 0001              SUBROUTINE LABFQU(LOT)
          C        LABOR EQUIVALENTS SUBROUTINE
 0002              COMMON/COLON/ LUPAT(10), CAPIT(10), CGOODS(10), AREACL(10),
                   1 FAMLAB(10), MALES(10), FAMSIZ(10), CCOENT(10), CAPCON(10),
                   2 MORTYP(10), IORIG(10), CGOCON(10), CAPENT(10)
 0003              COMMON/POP/ MALE(10, 86), IFEM(10, 86), FAMSTR(10, 2), PDEP(86, 2)
                   1 ,  FLEQUI(2, 5), PDEATH(2, 86), PINDFM(2, 86),
                   2 PINDIM, PBIRTH(44), CALAGE(8), PROAGE(19), MARIT(10),
                   3 PMARRY, AGBRME, AGBRSD, PMIMIG, PRIMAG(2, 86),CALREQ(25),
                   4 PROREQ(8)
 0004              MALES(LOT) = 0
 0005              FAMSIZ(LOT) = 0.
 0006              FAMLAB(LOT) = 0.
 0007              DO 100 IAGE = 1, 86
 0008              FAMSIZ(LOT) = FAMSIZ(LOT) + FLOAT(MALE(LOT, IAGE))
 0009              FAMSIZ(LOT) = FAMSIZ(LOT) + FLOAT(IFEM(LOT, IAGE))
 0010              IAGECL = 5
          C        NOTE: "IAGE" IS ACTUALLY AGE IN YEARS + 1
 0011              IF (IAGE .LE. 18) IAGECL = 4
 0012              IF (IAGE .LE. 12) IAGECL = 3
 0013              IF (IAGE .LE.  9) IAGECL = 2
 0014              IF (IAGE .LE.  7) IAGECL = 1
 0015              FAMLAB(LOT) = FAMLAB(LOT) + FLEQUI(1,IAGECL)*FLOAT(MALE(LOT,IAGE))
 0016              FAMLAB(LOT) = FAMLAB(LOT) + FLEQUI(2,IAGECL)*FLOAT(IFEM(LOT,IAGE))
 0017              IF (IAGE .GE. 18) MALES(LOT) = MALES(LOT) + MALE(LOT, IAGE)
 0018          100 CONTINUE
          C        CONVERSION TO MAN-DAYS PER YEAR (365.25 DAYS LESS 52 SUNDAYS)
 0019              FAMLAB(LOT) = FAMLAB(LOT) * 313.25
 0020              MALES(LOT) = MALES(LOT) * 365
 0021              RETURN
 0022              END
   *OPTIONS IN EFFECT*  ID,EBCDIC,SOURCE,LIST,NODECK,LOAD,NOMAP
   *OPTIONS IN EFFECT*  NAME = LABFQU   , LINECNT =      57
   *STATISTICS*     SOURCE STATEMENTS =         22,PROGRAM SIZE =        946
   *STATISTICS*  NO DIAGNOSTICS GENERATED

NO STATEMENTS FLAGGED IN THE ABOVE COMPILATIONS.
```

```
      C     SPENT IN ACQUIRING FINANCING
      C     FOR FIRST CALL OF LOT AND YEAR FOR NON-SETTLEMENT LOANS
        851 FINLAB = BRAND(DBLE(FINLSD), DBLE(FINLME))
      C     RATES FINANCED SAVED
            PCHSFI = FINPC
            LGCALL = 2
            IF (FINLAB .LE. 0.) FINLAB = 0.
            DO 850 ICM = 1, 12
            FLTOT(ICM) = FLTOT(ICM) - FINLAB * PRFINL(ICM)
        850 FLMALE(ICM) = FLMALE(ICM) - FINLAB * PRFINL(ICM)
            FICOST = AMAX1(SNGL(BRAND(DBLE(FICOSD),
           1 DBLE(FICOME))), 0.)
      C     FINANCING COST TO BE DEDUCTED
            FIDEDU = FICOST
        852 IF (PCHSFI .LE. 0.1) GO TO 104
            IF (FIDEDU .LE. 0.) GO TO 104
      C     CAPIT REDUCED BY COST FRACTION FOR EXPECTED NUMBER
      C     OF RATES FINANCED TO PREVENT NEGATIVE CAPIT VALUES
      C     IF COST SUBTRACTED IN LUMP SUM
            CAPIT(LOT) = CAPIT(LOT) - FICOST / PCHSFI
            FIDEDU = FIDEDU - FICOST / PCHSFI
            PCHSFI = PCHSFI - 1.
            GO TO 104
        102 CONTINUE
      C     FOR ADDITIONS TO PREVIOUS LOANS
            AMTLO(LOT, LONO) = AMTLO(LOT, LONO) + AMTPHA(LOTYPE) * UNIT
        104 CONTINUE
      C     OTHER CAPITAL GOODS LOANS GO DIRECTLY TO CAPITAL GOODS
            IF (LOTYPE .EQ. 5) CGOODS(LOT) = CGOODS(LOT) + AMTPHA(5) * UNIT
      C     PRIVATE LOANS GO TO CONSUMPTION CASH
            IF (LOTYPE .EQ. 12) CAPCON(LOT) = CAPCON(LOT) + AMTPHA(12) * UNIT
      C     NOTE: INCRA DEBT (LOAN TYPE=4) DOES NOT GO TO EITHER CAPIT OR
      C     CAPCON (ORIGINAL COLONISTS ARE ASSUMED TO FEED THEMSELVES DURING
      C     THE FIRST YEAR ON INCRA SALARIES
            IF (LOTYPE .EQ. 6 .OR. LOTYPE .EQ. 4) GO TO 900
            IF (LOTYPE .EQ. 1 .OR. LOTYPE .EQ. 5) GO TO 900
            IF (LOTYPE .EQ.12) GO TO 900
      C     ADJUSTMENTS TO CAPITAL FOR ALL LOANS EXCEPT LAND AND HOUSE LOANS,
      C     INCRA DEBT, CAPITAL GOODS, INCRA SEED LOANS AND PRIVATE LOANS
            CAPIT(LOT) = CAPIT(LOT) + AMTPHA(LOTYPE) * UNIT
            GO TO 900
        103 WRITE (6, 1000) LOT, LOTYPE, IYR
       1000 FORMAT(1X, 'ERROR: MORE THAN MAXIMUM ALLOWABLE NUMBER OF LOANS',
           1 / 1X, 'REQUESTED IN LOANG FOR LOT=', I5, 2X, 'LOAN TYPE=', I5,
           2 2X, 'YEAR=', I5)
            CALL SYSTEM
        900 CONTINUE
            RETURN
            END
END OF FILE
```

LOTPRO

Purpose:	lot production: calculates yield in each patch and total amount of each product in lot.
Kind of routine:	subroutine
Arguments:	LOT lot number IPCH patch number
COMMON areas:	PROD, YIELDS, SIZES, AREAS, USECOM
Routines called:	RIYLD, MZYLD, PSYLD, VIYLD, BMYLD, SMYLD, CAYLD, PEYLD, PAYLD, USECNT, LEARN
Routine called by:	MAIN
Program size:	3368 bytes

```
      SUBROUTINE LOTPRO(LOT, IPCH)
C     LOT PRODUCTION SUBROUTINE.  CALCULATES YIELD IN EACH PATCH AND
C     TOTAL AMOUNT OF EACH CROP PRODUCED IN THE LOT.
      COMMON/PROD/ PRES(17), SEEDST(10, 4), SEED(4)
      COMMON/USECOM/ LUSE(10,100), IDUR(10,100), LASTUS(10,100),
     1 CONTIN(10,100)
      COMMON/YIELDS/ YLDRI, YLDMZ, YLDPS, YLDVI, YLDBN, YLDSM, YLDPE,
     1 YLDCA, YLDPA
      COMMON/SIZES/ LOTS, NOPCHS, SIZLOT, SIZPCH
      COMMON/AREAS/ AREA(10)
      LU = LUSE(LOT, IPCH)
      GO TO (100, 100, 100, 150, 101, 102, 103, 104, 105, 106, 107,
     1 108, 109, 110, 111, 112, 113, 100, 101, 114, 115, 116, 117,
     2 118), LU
      WRITE (6, 1000) LUSE(LOT, IPCH), LOT, IPCH
 1000 FORMAT(1X, 'ERROR: LAND USE CODE', I5, 2X, 'NOT RECOGNIZED IN',
     1 1X, 'YIELDS FOR LOT=', I5, 2X, 'PATCH=', I5)
      CALL SYSTEM
  101 CONTINUE
C     RICE ALONE
      CALL RIYLD(LOT, IPCH)
      PRES(1) = PRES(1) + YLDRI * SIZPCH
      CALL USECNT(1, YLDRI)
      AREA(1) = AREA(1) + SIZPCH
      CALL LEARN(LOT, LU, YLDRI)
      GO TO 100
  102 CONTINUE
C     RICE WITH MAIZE
      CALL MZYLD(LOT, IPCH)
      PRES(2) = PRES(2) + YLDMZ * SIZPCH
      CALL USECNT(4, YLDMZ)
      AREA(2) = AREA(2) + SIZPCH
  201 CONTINUE
C     RICE INTERPLANTED
      CALL RIYLD(LOT, IPCH)
      PRES(1) = PRES(1) + YLDRI * SIZPCH
      CALL USECNT(2, YLDRI)
      AREA(1) = AREA(1) + SIZPCH
      CALL LEARN(LOT, LU, YLDRI)
      GO TO 100
  103 CONTINUE
C     MAIZE ALONE
      CALL MZYLD(LOT, IPCH)
      PRES(2) = PRES(2) + YLDMZ * SIZPCH
      CALL USECNT(3, YLDMZ)
      AREA(2) = AREA(2) + SIZPCH
      CALL LEARN(LOT, LU, YLDMZ)
      GO TO 100
  203 CONTINUE
C     MAIZE INTERPLANTED
      CALL MZYLD(LOT, IPCH)
      PRES(2) = PRES(2) + YLDMZ * SIZPCH
      CALL USECNT(4, YLDMZ)
      AREA(2) = AREA(2) + SIZPCH
      CALL LEARN(LOT, LU, YLDMZ)
      GO TO 100
  104 CONTINUE
C     PHASEOLUS ALONE
      CALL PSYLD(LOT, IPCH)
      PRES(3) = PRES(3) + YLDPS * SIZPCH
```

```
      CALL USECNT(5, YLDPS)
      AREA(3) = AREA(3) + SIZPCH
      CALL LEARN(LOT, LU, YLDPS)
      GO TO 100
  105 CONTINUE
C     GREEN MAIZE AND PHASEOLUS
      CALL MZYLD(LOT, IPCH)
      PRES(2) = PRES(2) + YLDMZ * SIZPCH
      CALL USECNT(4, YLDMZ)
      AREA(2) = AREA(2) + SIZPCH
      GO TO 104
  106 CONTINUE
C     VIGNA ALONE
      CALL VIYLD(LOT, IPCH)
      PRES(4) = PRES(4) + YLDVI * SIZPCH
      CALL USECNT(6, YLDVI)
      AREA(4) = AREA(4) + SIZPCH
      CALL LEARN(LOT, LU, YLDVI)
      GO TO 100
  107 CONTINUE
C     GREEN MAIZE AND VIGNA
      CALL VIYLD(LOT, IPCH)
      PRES(4) = PRES(4) + YLDVI * SIZPCH
      CALL USECNT(6, YLDVI)
      AREA(4) = AREA(4) + SIZPCH
      CALL LEARN(LOT, LU, YLDVI)
      GO TO 203
  108 CONTINUE
C     BITTER MANIOC
      CALL BMYLD(LOT, IPCH)
      PRES(5) = PRES(5) + YLDBM * SIZPCH
      AREA(5) = AREA(5) + SIZPCH
C     FOLLOWING FOR "NEGATIVE YIELDS" ASSIGNED IN BMYLD
C     INDICATING SECOND YEAR MANIOC NOT TO BE COUNTED
      IF (YLDBM .LT. -0.1) GO TO 100
      CALL USECNT(7, YLDBM)
      CALL LEARN(LOT, LU, YLDBM)
      GO TO 100
  109 CONTINUE
C     RICE WITH BITTER MANIOC
      CALL BMYLD(LOT, IPCH)
      AREA(5) = AREA(5) + SIZPCH
C     FOLLOWING FOR "NEGATIVE YIELDS" ASSIGNED IN BMYLD
C     INDICATING SECOND YEAR MANIOC NOT TO BE COUNTED
      IF (YLDBM .LT. -0.1) GO TO 101
      PRES(5) = PRES(5) + YLDBM * SIZPCH
      CALL USECNT(7, YLDBM)
      CALL LEARN(LOT, LU, YLDBM)
      GO TO 201
  110 CONTINUE
C     MAIZE WITH BITTER MANIOC
      CALL BMYLD(LOT, IPCH)
      AREA(5) = AREA(5) + SIZPCH
C     FOLLOWING FOR "NEGATIVE YIELDS" ASSIGNED IN BMYLD
C     INDICATING SECOND YEAR MANIOC NOT TO BE COUNTED
      IF (YLDBM .LT. -0.1) GO TO 103
      PRES(5) = PRES(5) + YLDBM * SIZPCH
      CALL USECNT(7, YLDBM)
      CALL LEARN(LOT, LU, YLDBM)
      GO TO 203
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      111 CONTINUE
C         RICE, MAIZE AND BITTER MANIOC
          CALL BMYLD(LOT, IPCH)
          AREA(5) = AREA(5) + SIZPCH
C         FOLLOWING FOR "NEGATIVE YIELDS" ASSIGNED IN BMYLD
C         INDICATING SECOND YEAR MANIOC NOT TO BE COUNTED
          IF (YLDBM .LT. -0.1) GO TO 102
          PRES(5) = PRES(5) + YLDBM * SIZPCH
          CALL USECNT(7, YLDBM)
          CALL LEARN(LOT, LU, YLDBM)
          GO TO 102
      112 CONTINUE
C         SWEET MANIOC ALONE
          CALL SMYLD(LOT, IPCH)
          AREA(6) = AREA(6) + SIZPCH
C         FOLLOWING FOR "NEGATIVE YIELDS" ASSIGNED IN SMYLD
C         INDICATING SECOND YEAR MANIOC NOT TO BE COUNTED
          IF (YLDSM .LT. -0.1) GO TO 100
          PRES(6) = PRES(6) + YLDSM * SIZPCH
          CALL USECNT(8, YLDSM)
          CALL LEARN(LOT, LU, YLDSM)
          GO TO 100
      113 CONTINUE
C         RICE, MAIZE AND SWEET MANIOC
          CALL SMYLD(LOT, IPCH)
          AREA(6) = AREA(6) + SIZPCH
C         FOLLOWING FOR "NEGATIVE YIELDS" ASSIGNED IN SMYLD
C         INDICATING SECOND YEAR MANIOC NOT TO BE COUNTED
          IF (YLDSM .LT. -0.1) GO TO 102
          PRES(6) = PRES(6) + YLDSM * SIZPCH
          CALL USECNT(8, YLDSM)
          CALL LEARN(LOT, LU, YLDSM)
          GO TO 102
      114 CONTINUE
C         CACAO
          CALL CAYLD(LOT, IPCH)
          PRES(7) = PRES(7) + YLDCA * SIZPCH
          CALL USECNT(9, YLDCA)
          AREA(7) = AREA(7) + SIZPCH
          GO TO 100
      115 CONTINUE
C         BLACK PEPPER
          CALL PEYLD(LOT, IPCH)
          PRES(8) = PRES(8) + YLDPE * SIZPCH
          CALL USECNT(10, YLDPE)
          AREA(8) = AREA(8) + SIZPCH
          GO TO 100
      116 CONTINUE
C         RICE AND SWEET MANIOC
          CALL SMYLD(LOT, IPCH)
          AREA(6) = AREA(6) + SIZPCH
C         FOLLOWING FOR "NEGATIVE YIELDS" ASSIGNED IN SMYLD
C         INDICATING SECOND YEAR MANIOC NOT TO BE COUNTED
          IF (YLDSM .LT. -0.1) GO TO 101
          PRES(6) = PRES(6) + YLDSM * SIZPCH
          CALL USECNT(8, YLDSM)
          CALL LEARN(LOT, LU, YLDSM)
          GO TO 201
      117 CONTINUE
C         PASTURE WITH ANIMALS
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     181            CALL PAYLD(LOT, IPCH)
     182            PRES(12) = PRES(12) + YLDPA * SIZPCH
     183            CALL USECNT(11, YLDPA)
     184            GO TO 100
     185          118 CONTINUE
     186       C    MAIZE AND SWEET MANIOC
     187            CALL SMYLD(LOT, IPCH)
     188            AREA(6) = AREA(6) + SIZPCH
     189       C    FOLLOWING FOR "NEGATIVE YIELDS" ASSIGNED IN SMYLD
     190       C    INDICATING SECOND YEAR MANIOC NOT TO BE COUNTED
     191            IF (YLDSM .LT. -0.1) GO TO 103
     192            PRES(6) = PRES(6) + YLDSM * SIZPCH
     193            CALL USECNT(6, YLDSM)
     194            AREA(6) = AREA(6) + SIZPCH
     195            CALL LEARN(LOT, LU, YLDSM)
     196            GO TO 203
     197          150 CONTINUE
     198       C    SECOND GROWTH
     199            CALL USECNT(12, 0.)
     200          100 CONTINUE
     201            RETURN
     202            END
END OF FILE
```

LUALLO

Purpose:	land use allocation decisions
Kind of routine:	subroutine
Arguments:	IYR year of simulation
COMMON areas:	USECOM, SIZES, HISTOR, RANDOM, COLON, USEPR, DEMAND, ORDER, VIRGCL, LOANS, PROD, SEEDNE, FLAB, MISC, BURNS, DETERM.
Routines called:	ICLEAR, USETOT, LABOR, SUBSIS, ALLOC, PROBLU, LOANG, SEEDS, IFINAN, WAGE, MAINT, HEALTH, LABEQU, STRAT, ARAND, BRAND
Routine called by:	MAIN
Program size:	8976 bytes

```
      SUBROUTINE LUALLO(IYR)
C     LAND USE ALLOCATION SUBROUTINE
      INTEGER BUTYP, BUQUAL
      DIMENSION ICALL(12), NPPI(12), SEN(12), SECN(12), IAVAIL(100)
      COMMON/SEEDNE/ SEEDN, SEEDCN, ISCALL
      COMMON/PROD/ PHES(17), SEEDST(10, 4), SEED(4)
      COMMON/VIRGCL/ IVCLFI
      COMMON/LOANS/ PCINT1(12), PCINT2(12), MONCOR(12), IPERIO(12),
     1 IGRACE(12), AMTPHA(12), MAPIME(12), MAPISD(12), IBEGYR(12),
     2 IENDYR(12)
      COMMON/FLAB/ FLTOT(12), FLMALE(12), LABCAL
      COMMON/USECOM/ LUSE(10,100), IDUR(10,100), LASTUS(10,100),
     1 CONTIN(10,100)
      COMMON/SIZES/ LOTS, NOPCHS, SIZLOT, SIZPCH
      COMMON/HISTOR/ VIRGSO(10,100)
      COMMON/RANDOM/ INIT
      COMMON/COLON/ LUPAT(10), CAPIT(10), CGOODS(10), AREACL(10),
     1 FAMLAB(10), MALES(10), FAMSIZ(10), CGOENT(10), CAPCON(10),
     2 MORTYP(10), IORIG(10), CGOCON(10), CAPENT(10)
      COMMON/DEMAND/ MARI, MAMZ, MABE, MAMN
      COMMON/USEPH/ PLU(4, 10), PCAGPE, PPEGCA
C     NOTE THAT PLU IS DIMENSIONED FOR MORAN TYPES AND NUMBER OF CRO
      COMMON/MISC/SMTYPR, VITYPR
      COMMON/BUENS/ BUTYP(10,100), BUQUAL(10,100)
      COMMON/DETERM/ ISTOCH
      EXTERNAL LABOR, ICLEAR, PROBLU, IFINAN, ARAND
C     AVERAGE MAIZE DENSITY WHEN PLANTED ALONE (PLANTS/HA)
      DEMZAL = 6275.
C     AVERAGE MAIZE DENSITY WHEN INTERPLANTED WITH RICE (PLANTS/HA)
      DEMZRI = 3507.
C     AVERAGE MAIZE DENSITY WHEN INTERPLANTED WITH BEANS
      DEMZBE = 5624.
C     AVERAGE MAIZE DENSITY WHEN INTERPLANTED WITH MANIOC
      DEMZMN = 5119.
      DO 100 LOT=1, LOTS
C     INITIALIZATION OF LABOR CALL INDICATOR
      LABCAL = 1
C     LOANG CALL INDICATOR FOR LOT AND YEAR
      LGCALL = 1
      SEEDN = 0.
      SEEDCN = 0.
      DO 270 I3=1,12
      ICALL(I3) = 1
      SEN(I3) = 0.
      SECN(I3) = 0.
  270 NPPI(I3) = 0
      ISUB = 1
      DO 612 IAV = 1,NOPCHS
C     INITIALIZES AVAILABILITY INDICATOR
  612 IAVAIL(IAV) = 0
C     DETERMINATION OF LAND USE PATTERN (STRATEGY)
      CALL STRAT(LOT)
C     DETERMINATION OF PROBABILITIES OF USING VARIOUS CROPS AS CASH
C     CROPS FOR LOT
      PROBRI = PROBLU(LOT, 5)
      PROBMZ = PROBLU(LOT, 7)
      PROBPS = PROBLU(LOT, 8)
      PROBVI = PROBLU(LOT,10)
      PROBBN = PROBLU(LOT,12)
      PROBSM = PROBLU(LOT,16)
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      PROBCA = PROBLU(LOT,20)
      PROBPE = PROBLU(LOT,21)
      PROBPA = PROBLU(LOT,18)
      PROBPC = PROBLU(LOT,23)
C     INITIALIZATION OF NUMBER OF "TRYS" FOR ALLOCATION LABOR CHECKS
      ITRYS = 0
C     SWEET - BITTER MANIOC DECISION FOR LOT AND YEAR
C     PROBABILITY OF SWEET MANIOC AS TYPE  (SMTYPR)
      MNTYPE = 12
      XRAN = ABAND(INIT, -1.)
      IF (XRAN .LT. SMTYPR) MNTYPE = 16
C     PHASEOLUS - VIGNA DECISION FOR LOT AND YEAR
C     PROBABILITY OF VIGNA AS BEAN TYPE
      IBETYP = 8
      XRAN = ABAND(INIT, -1.)
      IF (XRAN .LT. VITYPR) IBETYP = 10
C     DETERMINATION OF SUBSISTENCE CROP AREA NEEDS
      CALL SUBSIS(LOT, IBETYP, MNTYPE)
C     INITIALIZATION OF SUBSISTENCE CROP TOTALS (HECTARES)
      RITOT = 0.
      RMZTOT = 0.
      BETOT = 0.
      RMNTOT = 0.
C     INDICATOR FOR MAINT CALL
      MAIN = 1
C     INITIALIZATION OF SEEDS CALLS COUNTER (CALLS FOR GIVEN LOT)
      ISCALL = 0
C     CALCULATION OF LABOR EQUIVALENTS OF FAMILY MEMBERS
      CALL LABEQU(LOT)
C     DETERMINATION OF WAGE LABOR DAYS, WITH ADJUSTMENT OF LABOR AND
C     CASH TOTALS.   NOTE: THE CAPITAL GENERATED GOES TO ACTUAL INVESTMENTS
C     THE FOLLOWING YEAR.
      CALL WAGE(LOT)
C     ADJUSTMENT OF LABOR FOR SICKNESS
      CALL HEALTH(LOT)
      DO 101 IP    = 1, NOPCHS
C     INITIALIZATION OF BURN TYPE AND QUALITY
      BUTYP(LOT, IP) = 0
      BUQUAL(LOT, IP) = 0
      IPCH = ICLEAR(LOT, IP)
C     LOAN CLEARING TYPE IF FELLING FINANCED
      LOCLTY = 0
      IF (IVCLFI .GE. 1) LOCLTY = 2
      IF (LOCLTY .EQ. 2 .AND. IYR .GE. IBEGYR(3)) LOCLTY = 3
C     CASES WHERE NO LAND AVAILABLE
C     FOR CLEARING
      IF (IPCH .EQ. 0) GO TO 610
C     AVAILABILITY INDICATOR SET TO INDICATE PATCH ALLOCATED
      IAVAIL(IPCH) = 1
C     SAVING OF PREVIOUS LAND USE (USE CODE FOR WHOLE YEAR)
      IPVLU = LUSE(LOT, IPCH)
      LUSE(LOT, IPCH) = 0
      I25 = MAXO((NOPCHS / 4), 25)
      IF (ITRYS .GE. I25) GO TO 510
C     SUBSISTENCE ALLOCATIONS
C     DETERMINATION OF WHETHER SUBSISTENCE CROPS ARE ALSO USED
C     FOR THE COLONIST AS CASH CROPS (TO ALLOW ADJUSTMENTS IF FINANCED)
      IF (ISTOCH .EQ. 2) GO TO 410
C     CASH CROP CHOICE DETERMINATION FOR DETERMINISTIC RUNS
      XMAX = AMAX1(PROBRI, PROBMZ, PROBPS, PROBBN, PROBSM,
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120           1 PROBCA, PROBPE, PROBPA, PROBPC)
121            XMAX = XMAX - 0.01
122            IF (PROBRI .GE. XMAX) JCR = 1
123            IF (PROBMZ .GE. XMAX) JCR = 2
124            IF (PROBPS .GE. XMAX) JCR = 3
125            IF (PROBVI .GE. XMAX) JCR = 4
126            IF (PROBBM .GE. XMAX) JCR = 5
127            IF (PROBSM .GE. XMAX) JCR = 6
128            IF (PROBCA .GE. XMAX) JCR = 7
129            IF (PROBPE .GE. XMAX) JCR = 8
130            IF (PROBPA .GE. XMAX) JCR = 9
131            IF (PROBPC .GE. XMAX) JCR = 10
132            PROBRI = 0.
133            PROBMZ = 0.
134            PROBPS = 0.
135            PROBVI = 0.
136            PROBBM = 0.
137            PROBSM = 0.
138            PROBCA = 0.
139            PROBPE = 0.
140            PROBPA = 0.
141            PROBPC = 0.
142            GO TO(400,401,402,403,404,405,406,407,408,409), JCR
143         400 PROBRI = 1.
144             GO TO 410
145         401 PROBMZ = 1.
146             GO TO 410
147         402 PROBPS = 1.
148             GO TO 410
149         403 PROBVI = 1.
150             GO TO 410
151         404 PROBBM = 1.
152             GO TO 410
153         405 PROBSM = 1.
154             GO TO 410
155         406 PROBCA = 1.
156             GO TO 410
157         407 PROBPE = 1.
158             GO TO 410
159         408 PROBPA = 1.
160             GO TO 410
161         409 PROBPC = 1.
162         410 CONTINUE
163             XRAN = ARAND(INIT, -1.)
164       C     RICE SUBSISTENCE ALLOCATION
165             IF (RITOT .GE. RARI) GO TO 201
166             IF (XRAN .LT. PROBRI) GO TO 501
167             IF (LABOR(LOT, IPCH, 5).EQ. 2) GO TO 201
168             CALL ALLOC(LOT, IPCH, 5)
169         710 RITOT = RITOT + SIZPCH
170       C     ADJUSTMENT OF MAIZE TOTAL IF MAIZE INTERPLANTED
171             IF (LUSE(LOT, IPCH) .EQ. 6 .OR. LUSE(LOT, IPCH) .EQ. 15 .OR.
172            1 LUSE(LOT, IPCH) .EQ. 17) RMZTOT = RMZTOT + SIZPCH * DEMZRI /
173            2 DEMZAL
174             IF (LUSE(LOT, IPCH) .EQ. 15 .OR. LUSE(LOT, IPCH) .EQ. 17) RMNTOT
175            1 = RMNTOT + SIZPCH
176             IF (LUSE(LOT, IPCH) .EQ. 13 .OR. LUSE(LOT, IPCH) .EQ. 22)
177            1 RMNTOT = RMNTOT + SIZPCH
178             GO TO 701
179         201 CONTINUE
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      C     BEANS SUBSISTENCE ALLOCATION
            IF (BETOT .GE. HABE) GO TO 202
            PCUM = PROBBI + PROBMZ
            IF (XRAN .GE. PCUM .AND. XRAN .LT. PROBPS) GO TO 503
            PCUM = PCUM + PROBPS
            IF (XRAN .GE. PCUM .AND. XRAN .LT. PROBVI) GO TO 504
            IF (LABOR(LOT, IPCH, IBETYP) .EQ. 2) GO TO 202
            CALL ALLOC(LOT, IPCH, IBETYP)
          711 BETOT = BETOT + SIZPCH
      C     ADJUSTMENT OF MAIZE TOTAL IF MAIZE INTERPLANTED
            IF (LUSE(LOT, IPCH) .EQ. 9 .OR. LUSE(LOT, IPCH) .EQ. 11) MZTOT
           1 = MZTOT + SIZPCH * DEMZBE / DEMZAL
            GO TO 701
          202 CONTINUE
      C     MANIOC SUBSISTENCE ALLOCATION
            IF (MNTOT .GE. HAMN) GO TO 200
            PCUM = PROBBI + PROBMZ + PROBPS + PROBVI
            IF (XRAN .GE. PCUM .AND. XRAN .LT. PROBBM) GO TO 505
            PCUM = PCUM + PROBBM
            IF (XRAN .GE. PCUM .AND. XRAN .LT. PROBSM) GO TO 506
            IF (LABOR(LOT, IPCH, IBETYP) .EQ. 2) GO TO 200
            CALL ALLOC(LOT, IPCH, MNTYPE)
          712 MNTOT = MNTOT + SIZPCH
      C     ADJUSTMENT OF MAIZE INTERPLANTING ON MAIZE TOTAL
            IF (LUSE(LOT, IPCH) .EQ. 14 .OR. LUSE(LOT, IPCH) .EQ. 15)GO TO 250
            IF (LUSE(LOT, IPCH) .EQ. 17 .OR. LUSE(LOT, IPCH) .EQ. 24)GO TO 250
            GO TO 701
          250 MZTOT = MZTOT + SIZPCH * DEMZMN / DEMZAL
            GO TO 701
          200 CONTINUE
      C     MAIZE SUBSISTENCE ALLOCATION
            IF (MZTOT .GE. HAMZ) GO TO 203
            IF (XRAN .GE. PROBBI .AND. XRAN .LT. PROBMZ) GO TO 502
            IF (LABOR(LOT, IPCH, 7) .EQ. 2) GO TO 203
            CALL ALLOC(LOT, IPCH, 7)
          713 MZTOT = MZTOT + SIZPCH
            GO TO 701
          203 CONTINUE
      C     INDICATOR FOR COMPLETION OF SUBSISTENCE ALLOCATIONS
            ISUB = 2
            IF (MAIN .EQ. 1) GO TO 880
            GO TO 881
          880 CONTINUE
      C     MAINTENANCE OF PERENNIAL CROPS AND PASTURE (FIRST CALL FOR LOT ONLY)
            CALL MAINT(LOT)
            MAIN = 2
          881 CONTINUE
      C
      C     CASH CROP ALLOCATIONS
      C
            XRAN = ARAND(INIT, -1.)
            IF (XRAN .LT. PROBBI) GO TO 501
            PCUM = PROBBI
            IF (XRAN .GE. PCUM .AND. XRAN .LT.(PCUM + PROBMZ)) GO TO 502
            PCUM = PCUM + PROBMZ
            IF (XRAN .GE. PCUM .AND. XRAN .LT.(PCUM + PROBPS)) GO TO 503
            PCUM = PCUM + PROBPS
            IF (XRAN .GE. PCUM .AND. XRAN .LT. (PCUM + PROBVI)) GO TO 504
            PCUM = PCUM + PROBVI
            IF (XRAN .GE. PCUM .AND. XRAN .LT. (PCUM + PROBBM)) GO TO 505
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240           PCUM = PCUM + PROBBM
241           IF (XRAN .GE. PCUM .AND. XRAN .LT. (PCUM + PROBSM)) GO TO 506
242           PCUM = PCUM + PROBSM
243           ICACAO = 1
244           IF (XRAN .GE. PCUM .AND. XRAN .LT. (PCUM + PROBPE)) GO TO 507
245           PCUM = PCUM + PROBPE + PROBCA
246           ICACAO =2
247           IF (XRAN .LT. PCUM) GO TO 507
248           PCUM = PCUM + PROBPA
249           IF (XRAN .LT. PCUM) GO TO 509
250           GO TO 511
251         501 CONTINUE
252       C     RICE AS CASH CROP
253       C     LOAN TYPE
254           LOTY = 7
255       C     PRODUCT NUMBER ("COSTS" CODES)
256           IPRO = 1
257       C     OPERATION ("LABOR" CODES)
258           IOP = 4
259       C     LAND USE CODE
260           LUCO = 5
261         650 CONTINUE
262       C     FOLLOWING MAKES TENTATIVE FINANCING TO TEST FEASIBILITY, RESETS
263       C     VALUES IF NOT FEASIBLE, AND GRANTS LOAN IF FEASIBLE (FOR RICE,
264       C     MAIZE, PHASEOLUS AND VIGNA ONLY)
265           IF (ICALL(IPRO) .EQ. 1) NPFI(IPRO)=IFINAN(LOT,IOP,100.,LOTY)
266       C     TENTATIVE FINANCING INDICATOR (IFTENT: 1=NOT TENTATIVELY FINANCED;
267       C     2=TENTATIVELY FINANCED
268           IFTENT = 1
269           ICALL(IPRO) = 2
270           IF (NPFI(IPRO) .LE. 0) GO TO 600
271       C     ASSIGNMENT OF CLEARING LOAN TYPE
272           LOCLTY = 0
273           IF (LASTUS(LOT, IPCH) .EQ. 1 .AND. IVCLFI .EQ. 1)
274          1 LOCLTY = 2
275           IF (LOCLTY .EQ. 2 .AND. IYR .GE. IBEGYR(3)) LOCLTY = 3
276           CAPIT(LOT) = CAPIT(LCT) + SIZPCH * AMTPHA(LOTY) + SEEDCN
277           SEEDST(LOT, IPRO) = SEEDST(LOT, IPRO) + SEN(IPRO)
278           IFTENT = 2
279         600 IF (ITRYS .GE. 1) GO TO 660
280           CALL SEEDS(LOT, IPRO)
281           SEN(IPRO) = SEEDN
282           SECN(IPRO) = SEEDCN
283         660 IF (LABOR(LOT, IPCH, LUCO) .EQ. 2) GO TO(300, 601), IFTENT
284           IF (IFTENT .EQ. 1) GO TO 602
285           NPFI(IPRO) = NPFI(IPRO) - 1
286       C     CAPITAL REDUCED BY AMOUNT OF LOAN (WHICH WILL BE RESTORED THROUGH
287       C     CALL ON LOANG)
288           CAPIT(LOT) = CAPIT(LOT) - AMTPHA(LOTY) * SIZPCH
289       C     CAPITAL REDUCED FOR CLEARING LOANS PRIOR TO
290       C     RESTORATION THROUGH LOANG CALL
291       C     GRANTING OF LOAN
292           CALL LOANG(LOT, LOTY, LGCALL)
293           GO TO 602
294         601 CAPIT(LOT) = CAPIT(LOT) - SIZPCH * AMTPHA(LOTY)
295       C     NOTE: INCRA SEEDS NOT RETURNED IF FEASIBILITY CHECK UNSUCCESSFUL
296       C     (COMPENSATES FOR "EATEN" SEEDS).
297           IF (ISUB  .EQ. 1) GO TO(201,203,202,202), IPRO
298           GO TO 300
299         602 CALL ALLOC(LOT, IPCH, LUCO)
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300           GO TO (710,713, 711, 711), IPRO
301         300 CONTINUE
302       C     ALLOWS 10 TRYS PER LOT TO ALLOCATE PATCHES WHERE LABOR AND/OR
303       C     CAPITAL FOUND INSUFFICIENT FOR FIRST LAND USE CHOICE.
304       C     THIS BOTH AGREES WITH OBSERVED FAILURE OF COLONISTS TO PLANT
305       C     PASTURE WITHOUT ANIMALS ALTHOUGH CHEAP (BASED ON PROBLU FOR PASTURE)
306       C     AND PROTECTS LABOR FUNCTION FROM SPURIOUS CALLS FOR PATCHES THAT
307       C     WOULD NOT BE ALLOCATED TO CROPS.
308           ITRYS = ITRYS + 1
309           IF (ITRYS .GE. 11) GO TO 510
310           GO TO 203
311         502 CONTINUE
312       C     MAIZE AS CASH CROP
313           LOTY = 8
314           IPRO = 2
315           IOP = 5
316           LUCO = 7
317           GO TO 650
318         503 CONTINUE
319       C     PHASEOLUS AS CASH CROP
320           LOTY = 9
321           IPRO = 3
322           IOP = 6
323           LUCO = 8
324           GO TO 650
325         504 CONTINUE
326       C     VIGNA AS CASH CROP
327           CALL SEEDS(LOT, 4)
328           CAPIT(LOT) = CAPIT(LOT) - SEEDCH
329           IF (LABOR(LOT, IPCH, 10) .EQ. 2) GO TO 651
330           CALL ALLOC(LOT, IPCH, 10)
331           GO TO 711
332         651 CAPIT(LOT) = CAPIT(LOT) + SEEDCH
333           IF (ISUB .EQ. 1) GO TO 202
334           GO TO 300
335         505 CONTINUE
336       C     BITTER MANIOC AS CASH CROP
337           IF (LABOR(LOT, IPCH, 12) .EQ. 2) GO TO 652
338           CALL ALLOC(LOT, IPCH, 12)
339           GO TO 712
340         652 IF (ISUB .EQ. 1) GO TO 200
341           GO TO 300
342         506 CONTINUE
343       C     SWEET MANIOC AS CASH CROP
344           IF (LABOR(LOT, IPCH, 16) .EQ. 2) GO TO 652
345           CALL ALLOC(LOT, IPCH, 16)
346           GO TO 712
347         507 CONTINUE
348       C     CACAO OR PEPPER AS CASH CROP
349       C     DETERMINATION OF CACAO OR PEPPER SPECIALIZATION OF COLONIST
350           ICAC = 0
351           IPEP = 0
352           DO 802 IPC = 1, NOPCHS
353           IF (LUSE(LOT, IPC) .EQ. 20) ICAC = ICAC + 1
354         802 IF (LUSE(LOT, IPC) .EQ. 21) IPEP = IPEP + 1
355           XRAN = ARAND(INIT, -1.)
356           IF (ICAC .EQ. 0 .AND. IPEP .EQ. 0)GO TO 803
357           IF (ICAC .GE. IPEP) GO TO 800
358       C     FOR PEPPER SPECIALIZED COLONISTS
359           IF (XRAN .LE. PCAGPE) GO TO 508
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360         801 CONTINUE
361             LOTY = 10
362             IPRO = 8
363             IOP = 9
364             LUCO = 21
365             GO TO 956
366         800 CONTINUE
367       C     FOR CACAO SPECIALIZED COLONISTS
368             IF (IRAN .LE. PPEGCA) GO TO 801
369         508 CONTINUE
370       C     FOR CACAO AS CASH CROP
371             LOTY = 10
372             IPRO = 7
373             IOP = 8
374             LUCO = 20
375             GO TO 956
376         803 CONTINUE
377       C     FOR COLONISTS WITH NO CACAO OR PEPPER
378             IF (ICACAO .EQ. 2) GO TO 508
379             GO TO 801
380         509 CONTINUE
381       C     PASTURE WITHOUT ANIMALS AS CASH CROP
382             IF (LABOR(LOT, IPCH, 18) .EQ. 2) GO TO 300
383             CALL ALLOC(LOT, IPCH, 18)
384             GO TO 701
385         511 CONTINUE
386       C     PASTURE WITH ANIMALS AS CASE CROP
387       C     IF LABOR AND CAPITAL NOT SUFFICIENT, PATCH GOES TO PASTURE WITHOUT
388       C     ANIMALS
389             LOTY = 11
390             IPRO = 12
391             IOP = 11
392             LUCO = 23
393         956 CONTINUE
394       C     FINANCING CHECK FOR CACAO, PEPPER, PASTURE AND CATTLE
395             IF (ICALL(IPRO) .EQ. 1) NPFI(IPRO)=IFINAN(LOT,IOP,100.,LOTY)
396       C     TENTATIVE FINANCING INDICATOR (1=NOT TENT. FIN.; 2=TENT. FINANCED)
397             IFTENT = 1
398             ICALL(IPRO) = 2
399             IF (NPFI(IPRO) .LE. 0) GO TO 953
400             CAPIT(LOT)=CAPIT(LOT) + SIZPCH * AMTPHA(LOTY)
401             IFTENT = 2
402         953 IF (LABOR(LOT, IPCH, LUCO) .EQ. 2) GO TO 954
403             IF (IFTENT .EQ. 1) GO TO 955
404             NPFI(IPRO) = NPFI(IPRO) - 1
405       C     CAPITAL REDUCTION TO BE RESTORED BY LOANG CALL
406             CAPIT(LOT) = CAPIT(LOT) - AMTPHA(LOTY) * SIZPCH
407             CALL LOANG(LOT, LOTY, LGCALL)
408             GO TO 955
409         954 CAPIT(LOT) = CAPIT(LOT) - SIZPCH * AMTPHA(LOTY)
410             GO TO 300
411         955 CALL ALLOC(LOT, IPCH, LUCO)
412             GO TO 701
413         510 CONTINUE
414       C     UNALLOCATED LAND
415       C     IF A TENTATIVE CLEARING LOAN HAD BEEN ADDED TO CAPIT
416       C     IN ICLEAR, THE AMOUNT IS SUBTRACTED SINCE THE PATCH
417       C     WAS NOT SUCCESSFULLY ALLOCATED TO A CROP.
418             IF (LOCLTY .GE. 1) CAPIT(LOT) = CAPIT(LOT) - SIZPCH *
419            1 AMTPHA(LUCLTY)
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  420           IF (IPVLU .GE. 18 .AND. IPVLU .LE. 21) GO TO 950
  421           IF (IPVLU .EQ. 1 .OR. IPVLU .EQ. 4) GO TO 950
  422           IF (IPVLU .EQ. 3) LUSE(LOT, IPCH) = 4
  423           IF (IPVLU .EQ. 2) LUSE(LOT, IPCH) = 3
  424           IF (IPVLU .GE. 5 .AND. IPVLU .LE. 17)
  425          1 LUSE(LOT, IPCH) = 3
  426           IF (IPVLU .EQ. 22 .OR. IPVLU .EQ. 24)
  427          1 LUSE(LOT, IPCH) = 3
  428           IF (IPVLU .EQ. 19) LUSE(LOT, IPCH) = 18
  429           IVCLFI = 0
  430           GO TO 951
  431       610 CONTINUE
  432     C     FOR CASES WHERE NO PATCHES ARE AVAILABLE:  A PATCH
  433     C     IS FOUND WHICH WAS UNAVAILABLE
  434           DO 611 IPA = 1,NOPCHS
  435           IF (IAVAIL(IPA) .EQ. 1) GO TO 611
  436           IAVAIL(IPA) = 1
  437           IPCH = IPA
  438           IPVLU = LUSE(LOT, IPCH)
  439           GO TO 510
  440       611 CONTINUE
  441       950 LUSE(LOT, IPCH) = IPVLU
  442       701 CONTINUE
  443     C     MAKES VIRGIN CLEARING LOAN IF ICLEAR HAD ADJUSTED CAPITAL
  444     C     FOR A (TENTATIVE) VIRGIN CLEARING LOAN.  FIRST CAPIT IS
  445     C     REDUCED BY THE AMOUNT, AND THEN THE AMOUNT IS RESTORED THROUGH THE
  446     C     LOANG SUBROUTINE WITH APPROPRIATE ASSIGNMENT OF DEBTS.
  447           IF (IVCLFI .EQ. 0) GO TO 951
  448           IF (LASTUS(LOT, IPCH) .GE. 2) GO TO 952
  449           CALL LOANG(LOT, LOCLTY, LGCALL)
  450       952 CAPIT(LOT) = CAPIT(LOT) - AMTPHA(LOCLTY) * SIZPCH
  451           IVCLFI = 0
  452       951 CONTINUE
  453     C     LAND USE TOTALS UPDATING FOR PATCH
  454           CALL USETOT(LOT, IPCH, IPVLU, IP)
  455       101 CONTINUE
  456       100 CONTINUE
  457           RETURN
  458           END
END OF FILE
```

MAIN

Purpose:	main program (KPROG2): handles most (but not all) input and output operations, coordinates program operations by level (years, lots, and patches). Produces either deterministic or stochastic simulations for estimation of carrying capacity. Computed consumption and environmental quality measures are compared with standards to obtain probabilities of colonist failure.
Kind of routine:	main program
COMMON areas:	AREAS, BQCALL, BUPROB, COLON, COSTS, DATE, DETERM, DISEA, FERT, FICOST, FIN, FOOD, FPROBS, GAME, INTERP, LOANS, LUOUT, MATRIX, MISC, NUTRI, PASTUR, POP, PRALCO, PROD, RANDOM, REQUIR, SICK, SIZES, SOIL, SPOIL, STAND, SUMMAR, TRANSP, TUBERS, USECOM, USEPR, WEEDS
Routines called:	ARAND, CDISEA, EROSN, INITSQ, LEAVE, LOANG, LOTPRO, LUALLO, MEASUR, OUTPUT, POPGEN, POPUL, PRALLO, PRICES, SOILCH, TECHNO, WEAGEN
Input units:	5 = *SOURCE* (the terminal) 14= BANKDATA
Output units:	6=*SINK* (the terminal, for prompts and error messages) 7=outputfile4 (annual crops and pasture soils) 8=outputfile5 (cacao and pepper soil quality) 9=outputfile6 (run summary) 12=outputfile1 (plotted summary) 13=outputfile2 (carrying capacity measures list) 15=outputfile3 (land use measures list)
Program size:	10884 bytes (main program only)

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      C     KPROG2  MAIN  - FOR 10 LOTS, 100 PATCHES PER LOT MAXIMUM
      C     INPUT UNITS  5=*SOURCE* 14=BANKDATA
      C     OUTPUT UNITS ARE: 6=*SINK* 7=OUTPUTFILE4 (ANNUALS & PASTURE SOILS)
      C     8=OUTPUTFILE5 (CACAO & PEPPER SOIL QUALITY)
      C     9=OUTPUTFILE6 (RUN SUMMARY)
      C     12=OUTPUTFILE1 (PLOTTED OUTPUT)
      C     13=OUTPUTFILE2(CARRYING CAPACITY MEASURES LIST)
      C     15=OUTPUTFILE3 (LAND USE MEASURES LIST)
      C
            DOUBLE PRECISION ELLIM
            DOUBLE PRECISION PHOS, PH, AL, NITRO, CARB, CLAY, SLOPE
            COMMON/SPOIL/ ESPOIL(10), SPOIME(10), SPOISD(10), SPOSME(10),
           1 SPOSSD(10)
            COMMON/LOANS/ PCINT1(12), PCINT2(12), MONCOR(12), IPERIO(12),
           1 IGRACE(12), AMTPHA(12), MAPIME(12), MAPISD(12), IBEGYR(12),
           2 IENDYR(12)
            COMMON/FIN/ ISOLV(10), DUEPRI(20), DUEINT(20), AMTLO(10, 20),
           1 LOANDA(10, 20), LOANTY(10, 20), MAXNLO, RAINFL
            COMMON/FPROBS/ PRFIN(12)
            COMMON/SOIL/ PHOS(10,100), PH(10,100), AL(10,100),
           1 NITRO(10,100), CARB(10,100), CLAY(10,100), SLOPE(10,100)
            COMMON/FICOST/ FINLSD, FINLME, FICOSD, FICOME, PRFINL(12)
            COMMON/PASTUR/ BASEPY, YREFF(5), PACOEF, PACONS, PACHIP, WGPTDM,
           1 TDNPDE
            COMMON/DISEA/ PINFEC(3, 2), LSPORE(3), IBPOD(10,100),
           1 IWBROO(10,100), IFUSAR(10,100), IWBEST, IFUEST, IBPEST,
           1BPMULT,WBMULT,FUMULT, PRDIES(3)
            COMMON/FERT/ ELLIM(2), DOSECA(4, 2, 3), DOSEPE(4, 2, 4),
           1 PRICFE(5),
           1 PFERT(2), SLOLI, CONSLI, ALLIME, SLOPHO, CONPHO,
           1 IFERT(10,100)
            COMMON/GAME/ SMEAT, IHUNT(10), PHUNT, IENDHU, EFFORT(12), YLDSLO,
           1 YLDINT, EFFSLO, EFFINT, GWASTE
            COMMON/TRANSP/ PRNOTR(3, 2), IYRTPT, PRZONE(3)
            COMMON/PROD/ PRES(17), SEEDST(10, 4), SEED(4)
            COMMON/AREAS/ AREA(10)
      C     NOTE THAT AREAS ARE DIMENSIONED FOR NUMBER OF CROPS
            COMMON/SIZES/ LOTS, NOPCHS, SIZLOT, SIZPCH
            COMMON/DATE/ IYR
            COMMON/MATRIX/ PROB(7, 7, 2)
            COMMON/RANDOM/ INIT
            COMMON/REQUIR/REQTL(12,15), REQML(12, 15), REQPC(12, 15)
            COMMON/OUTSID/ PCRECD, CRECME, CRECSD, PCSENT, CSENME, CSENSD
            COMMON/USEPR/ PLU(4, 10), PCAGPE, PPEGCA
      C     NOTE THAT PLU IS DIMENSIONED FOR MORAN TYPES AND CROPS
            COMMON/INTERP/ PRI, PRIMZ, PRIBM, PRISM, PRIMZS, PRIPA, PRPS,
           1 PRVI, PRBM, PRBMRI, PRBMMZ, PRSM, PRSMRI, PRSMMZ, PRIMZB
            COMMON/USECOM/ LUSE(10,100), IDUR(10,100), LASTUS(10,100),
           1 CONTIN(10,100)
            COMMON/NUTRI/ CALOR(17), TOTPRO(17), ANIPRO(17)
            COMMON/SICK/ DALOME(3), DALOSD(3), PDISEA(3, 2, 13), PDISMO(3, 12)
            COMMON/STAND/ CALMIN, PROMIN, ANPMIN, CHPFMI, CHPCMI, CLLMAX,
           1 STDRD(14, 50)
            COMMON/POP/ MALE(10, 86), IFEM(10, 86), FAMSTR(10, 2),
           1 PDDP(86, 2), FLEQUI(2, 5), PDEATH(2, 86),
           2 PINDEM(2, 86), PINDIE, PBIRTH(44), CALAGE(8), PROAGE(19),
           3 MARIT(10), PMARRY, AGBRME, AGBRSD, PMINIG, PRIMAG(2, 86),
           4 CALREQ(25), PROREQ(8)
      C     NOTE THAT FAMSTR IS DIMENSIONED FOR ITEMS AND SEXES
            COMMON/COLON/ LUPAT(10), CAPIT(10), CGOODS(10), AREACL(10),
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      1 FAMLAB(10), MALES(10), FAMSIZ(10), CGCENT(10), CAPCON(10),
      2 MORTYP(10), IORIG(10), CGOCON(10), CAPENT(10)
       COMMON/MISC/SMTYPE, VITYPE
       COMMON/LUOUT/ USEOUT(3, 12), LOTUSE(12)
       COMMON/PRALCO/PSELLB(10), PRVOLP, PPLPAY, TRANME, TRANSD,
      1 BTRCME, BTRCSD, CHICME, CWASTE
C      NOTE THAT PSELLB IS DIMENSIONED FOR PRODUCTS
       COMMON/COSTS/ COLAB(12), BUYME(17), BUYSD(17), SELLME(17),
      1 SELLSD(17)
       COMMON/FOOD/ EAT(17), SUBNCH, EATGAM(10)
       COMMON/WEEDS/ CONMAX
       COMMON/BOCALL/ LLOTV, LYRV, LLOTSG, LYRSG, LLOTW, LYRW
       COMMON/DETERM/ ISTOCH
       COMMON/TUBERS/ TUBCAL, TUBTP
       COMMON/BUPNOR/ BURNPR(3)
       COMMON/YLDCAL/ ICRCAL(11)
       COMMON/SUMMAR/ FALLED
       EXTERNAL ARAND
C      MAXIMUM NUMBER OF LOTS
       LTSMAX = 10
C      MAXIMUM NUMBER OF PATCHES PER LOT
       NPMAX = 100
       WRITE (6, 3033)
 3033  FORMAT(1X, 'ENTER RUN NUMBER (FMT=I3)')
       READ (5, 3034) NORUN
 3034  FORMAT(I3)
       WRITE (6, 3043)
 3043  FORMAT(1X, 'ENTER RUN TYPE: 1=DETERMINISTIC; 2=STOCHASTIC ',
      1 1X, '(FMT=I1)')
       READ (5, 1012) ISTOCH
       WRITE (6, 3031)
 3031  FORMAT(1X, 'ENTER POPULATION SECTOR CODE: 1=FROZEN 2=DYNAMIC (FMT=
      1I1)')
       READ (5, 1012) IFREEZ
       READ (14, 1000) ((( PROB(I,J,K), I=1,7), J=1,7),K=1,2)
 1000  FORMAT(7F6.2)
C      ABOVE FORMAT 1000 FOR  PROBABILITY MATRIX FOR INITIAL
C      SOIL PH VALUES: I=PH CLASS AFTER MOVE, K=PH CLASS BEFORE MOVE,
C      AND 5=DISTANCE MOVED (100 METERS OR 500 METERS).
       WRITE (6, 1001)
 1001  FORMAT(1X,'ENTER NO. OF YEARS TO SIMULATE (FORMAT=I3)')
       READ (5, 3034) IYEARS
       WRITE (6, 1003)
 1003  FORMAT(1X, 'ENTER NUMBER OF LOTS (FORMAT=I3)')
       READ (5, 3034) LOTS
       READ (14, 2000) PRI, PRIMZ, PRIBM, PRISM, PRIMZS, PRIPA, PRIMZB,
      1 PRPS, PRVI, PRBM, PRBMRI, PRBMMZ, PRSM, PRSMRI, PRSMMZ
 2000  FORMAT(7F5.2, / F5.2, / F5.2, / 3F5.2, / 3F5.2)
C      ABOVE FORMAT 2000 FOR INTERPLANTING INFORMATION (NB: ALSO WITH USEPR)
       READ (14, 2001) ((PLU(ISTRAT, ICROP), ICROP=1,10), ISTRAT=1,4)
 2001  FORMAT(10F5.2)
C      ABOVE FORMAT 2001 FOR INTERPLANT FOR PROBABILITIES OF CASH CROP
C      LAND USE BY CROPS (1=RICE  2=MAIZE 3=PHASEOLUS 4= VIGNA
C      5=BITTER MANIOC 6=SWEET MANIOC 7=CACAO 8=PEPPER  9=PASTURE WITHOUT
C      ANIMALS 10=PASTURE WITH ANIMALS) AND STRATEGY ((1=ANN. CASH CROPS
C      2=TREE CROPS  3=RANCHING  4=OUTSIDE LABOR)
       READ (14, 2002) PCAGPE, PPEGCA
 2002  FORMAT(2F5.2)
C      ABOVE FORMAT 2002 FOR INTERPLANTING: FOR CASH CROP SPECIALIZATION
C      --PROBABILITY OF CACAO GIVEN PEPPER SPECIALIZATION AND
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121      C      PROBABILITY OF PEPPER GIVEN CACAO SPECIALIZATION
122             READ (14, 2003) ((REQTL(MOCAL, IOPER), MOCAL=1,12),IOPER=1,15)
123       2003 FORMAT(12F6.1)
124      C      ABOVE FORMAT 2003  FOR TOTAL LABOR (REGARDLESS
125      C      OF SEX AND AGE) AND MALE LABOR FOR OPERATIONS BY CALENDAR MONTH.
126      C      ALL LABOR REQUIREMENTS ARE IN MAN-DAY EQUIVALENTS PER HECTARE.
127      C      OPERATIONS ARE: 1=VIRGIN CLEARING  2=SECOND GROWTH CLEARING
128      C      3=WEED CLEARING  4=RICE  5=MAIZE  6=BEANS  7=MANIOC  8=CACAO
129      C      9=PEPPER  10=PASTURE WITHOUT ANIMALS  11=PASTURE WITH CATTLE
130             READ (14, 2003) ((REQML(MOCAL, IOPER), MOCAL=1,12), IOPER=1,15)
131             READ (14, 2004) ((REQFC(MOCAL, IOPER), MOCAL=1,12), IOPER=1,15)
132       2004 FORMAT(12F6.0)
133      C      ABOVE FORMAT 2004  FOR FIXED COST REQUIREMENTS
134      C      BY OPERATION AND MONTH.  ALL COSTS IN JAN 1, 1975 CRUZEIROS / HA.
135             READ (14, 3001) (PCINT1(ITY), PCINT2(ITY), MONCOR(ITY), IPERIO(ITY)
136            1 , IGRACE(ITY), AMIPHA(ITY), HAPIME(ITY), HAFISD(ITY), IBEGYR(ITY)
137            2 , IENDYR(ITY), ITY = 1, 12)
138       3001 FORMAT(2F4.1, I2, 2I3, F5.0, 2F3.0, 2I3)
139      C      ABOVE FORMAT 3001 .  FOR EACH LOAN TYPE (LOAN
140      C      TYPE CODES: 1=LAND & HOUSE, 2=VIRGIN FELLING (INCLUDING BROCA AND
141      C      COIVARA) OF 8 YR PERIOD, 3=VIRGIN FELLING OF 1 YR PERIOD,
142      C      4=INCRA DEBT FOR SALARIES AND NON-DURABLE ITEMS,  5=OTHER DEBT FOR
143      C      DURABLE ITEMS (POWER SAWS,ETC.), 6=INCRA SEEDS  7=RICE PLANTING-
144      C      HARVESTING (CUSTEIO) COSTS (INCLUDING SECOND GROWTH OR WEED
145      C      CUTTING), 8=MAIZE CUSTEIO, 9=PHASEOLUS CUSTEIO, 10=PEPPER OR CACAO
146      C      11=CATTLE & PASTURE WITH ANIMALS,  12=PRIVATE) ARE GIVEN:
147      C      PERCENT INTEREST AT FIRST LEVEL (WITHOUT LATE PAYMENT PENALTY),
148      C      PERCENT INTEREST AT SECOND LEVEL (WITH LATE PAYMENT PENALTY),
149      C      MONITARY CORRECTION CODE (1=NO  2=YES), LOAN PERIOD IN YEARS,
150      C      GRACE PERIOD ON PRINCIPAL IN YEARS,  AMOUNT PER HECTARE IN 1975
151      C      CRUZEIROS (FOR LOAN TYPES 1, 4, 5, 11 & 12 THIS IS
152      C       THE MEAN AMOUNT OF THE LOAN - WHILE "HAPIME" IS SET AT 1.
153      C      FOR THESE TYPES), MEAN HECTARES FINANCED, STANDARD DEVIATION
154      C      OF HECTARES FINANCED,
155      C      BEGINNING YEAR FOR AVAILABILITY OF THIS LOAN TYPE, AND ENDING YEAR
156      C      FOR AVAILABILITY OF THIS LOAN TYPE.
157             READ (14, 3003) RAINFL, MAXNLO
158       3003 FORMAT(F5.3, I3)
159      C      ABOVE FORMAT 3003 : RATE OF INFLATION AS A
160      C      PROPORTION OF INCREASE, AND MAXIMUM NUMBER OF LOANS OF DIFFERENT
161      C      TYPES AND/OR YEARS ALLOWED PER COLONIST
162             READ (14, 3000) (PRFIN(LOTY), LOTY=1, 12)
163       3000 FORMAT(12F5.2)
164      C      ABOVE FORMAT 3000 : PROBABILITIES OF FINANCING
165      C      BEING REQUESTED AND PICKED UP FROM BANK GIVEN A COLONIST HAS
166      C      DECIDED TO USE THIS CROP AS A CASH CROP AND IS SOLVENT
167             READ (14, 3002) (ESPOIL(IPROD), SPOIME(IPROD), SPOISD(IPROD),
168            1 SPOSME(IPROD), SPOSSD(IPROD), IPROD = 1, 10)
169       3002 FORMAT(5F5.2)
170      C      ABOVE FORMAT 3002  FOR EXPECTED SPOILAGE
171      C      PROPORTION, MEAN SPOILAGE PROPORTION FOR PRODUCT KEPT FOR
172      C      CONSUMPTION OR MARKET, STD. DEVIATION OF SAME, MEAN SPOILAGE
173      C      PROPORTION OF PRODUCT KEPT AS SEED (WHERE CROP IS A SEED CROP),
174      C      AND STANDARD DEVIATION OF SAME.
175             READ (14, 3004) PHUNT, IENDHU, YLDSLO, YLDINT, EFFSLO, EFFINT,
176            1 (EFFORT(ICM), ICM=1,12), GWASTE
177       3004 FORMAT(F5.2, I5, 4F6.2, / 12F6.3, / F5.2)
178      C      ABOVE FORMAT 3004 : PROBABILITY THAT A COLONIST
179      C      IS A HUNTER, ENDING YEAR FOR HUNTING, SLOPE OF GAME YIELD/MAN-DAY
180      C      DECLINE, INTERCEPT OF SAME, SLOPE OF EFFORT (MAN-DAYS/HUNTER/YEAR)
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181      C      DECLINE, INTERCEPT OF SAME, PROPORTION OF YEARLY EFFORT BY
182      C      CALENDAR MONTH, AND PROPORTION OF GAME LIVE WT. WASTED.
183             READ (14, 3005) ((PRNOTR(IZONE, ITIME), ITIME=1,2), IZONE=1,3),
184            1 IYRTPT, (PRZONE(IZ), IZ=1, 3)
185       3005 FORMAT(6F5.2, I3, 3F5.2)
186      C      ABOVE FORMAT 3005 : PROBABILITY TRANSPORT TO
187      C      MARKET UNAVAILABLE FOR 3 ZONES (1=ROADSIDE LOTS, 2=TRAVESSAO
188      C      BEFORE AGROVILA, 3=TRAVESSAO AFTER AGROVILA) AND 2 TIME PERIODS
189      C      (1=FIRST 3 YEARS  2=LATER YEARS), YEAR BEGINNING TIME PERIOD TWO,
190      C      AND PROPORTION OF LOTS IN EACH ZONE.
191             READ (14, 3010) ((PINFEC(IDIS, IEST), IEST = 1,2), IDIS=1,3),
192            1 (LSPORE(IDI),  IDI=1,3), (PRDIES(ID), ID=1,3),
193            2 BPMULT, WDMULT, FUMULT
194       3010 FORMAT(6F5.2, 3I4, 6F5.2)
195      C      ABOVE FORMAT 3010  FOR PERENNIAL CROP DISEASE
196      C      INFORMATION: PROBABILITY OF INFECTION FOR GIVEN PATCH AND YEAR
197      C      FOR 3 DISEASES (1=FUSARIUM 2=WITCHES BROOM 3=BLACK POD) SEPARATELY
198      C      BY ESTABLISHMENT STATUS (1=NOT ESTABLISHED IN AREA 2=ESTABLISHED),
199      C      LIFE OF SPORES OF EACH DISEASE IN YEARS, MULTIPLIER FOR YIELD
200      C      IF ATTACKED BY BLACK POD, WITCHES BROOM, AND FUSARIUM
201             READ (14, 3011) ((FAMSTR(ITEM, IORIGI), IORIGI=1,2), ITEM=1, 10)
202       3011 FORMAT(2(2F7.2 /), 3(2F7.4 /), 4(2F7.2 /), 2F7.2)
203      C      ABOVE FORMAT 3011  FOR FAMILY STRUCTURE.
204      C      ITEM CODES: 1=OWNER AGE MEAN 2=SD 3=PROB. OTHER DEPENDENTS IF
205      C      MARRIED 4=PROB. OTHER DEPENDENTS IF SINGLE  5=PROB. WIFE
206      C      6=WIFE AGE MEAN 7=WIFE AGE SD 8=PROB. OTHER DEP. IS MALE
207      C      9=NO. OTHER DEP. MEAN 10=SD.
208      C      ORIG CODES: 1=ORIGINAL COLONIST  2=NEWCOMER
209             READ (14, 3012) (DALOME(IDISEA), DALOSD(IDISEA), IDISEA=1, 3)
210       3012 FORMAT(6F6.1)
211      C      ABOVE FORMAT 3012  FOR DAYS LOST TO DISEASE (PER
212      C      ILLNESS) MEAN AND STD.DEV.  DISEASE CODES: 1=MALARIA 2=TRAUMA
213      C      3=OTHER
214             READ (14, 3013) (((PDISEA(IDIS, ISEX, IDAGE), IDAGE=1,13),ISEX=1,2)
215            1, IDIS=1, 3)
216       3013 FORMAT(5(7F7.4, / 6F7.4 /), 7F7.4, / 6F7.4)
217      C      ABOVE FORMAT 3013  FOR PROBABILITY OF DISEASE BY
218      C      DISEASE, SEX, AND DISEASE AGE CLASS.
219             READ (14, 3014) ((PDISMO(IDIS, ICMO), ICMO=1,12), IDIS=1, 3)
220       3014 FORMAT(5(6F6.3 /), 6F6.3)
221      C      ABOVE FORMAT 3014  FOR MONTHLY PROBABILITY OF
222      C      DISEASE GIVEN THAT INDIVIDUAL BECOMES DISEASED AT SOME TIME DURING
223      C      THE YEAR.  ICMO IS CALENDAR MONTH.
224             READ (14, 3015) ((PDEP(IAGE, IORI), IORI=1,2), IAGE=1,86)
225       3015 FORMAT(85(2F6.3 /), 2F6.3)
226      C      ABOVE FORMAT 3015  FOR PROBABILITIES THAT A
227      C      DEPENDENT (OTHER THAN THE WIFE) IS OF A GIVEN AGE GIVEN THAT THE
228      C      COLONIST HAS A DEPENDENT AND GIVEN THE COLONIST'S ORIGINAL OR
229      C      NEWCOMER STATUS.
230             READ (14, 3016) ((FLEQUI(ISEX, LABAGE), LABAGE=1,5), ISEX=1, 2)
231       3016 FORMAT(5F5.2, / 5F5.2)
232      C      ABOVE FORMAT 3016  FOR FAMILY LABOR EQUIVALENTS
233      C      BY SEX AND LABOR AGE CLASS.
234             READ (14, 3017) ((PDEATH(ISEX, IAGE), PINDEM(ISEX, IAGE),ISEX=1,2)
235            1, IAGE=1, 86)
236       3017 FORMAT(85(4F7.4 /), 4F7.4)
237      C      ABOVE FORMAT 3017  FOR PROBABILITY OF DEATH WHEN
238      C      ADEQUATELY NOURISHED BY SEX AND DEMOGRAPHIC AGE CLASS, AND THE
239      C      PROBABILITY OF INDIVIDUAL EMMIGRATION BY THE SAME CLASSES.
240             READ (14, 3018) (PBIRTH(IAGE), IAGE=15, 44)
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241      3018 FORMAT(10F6.3)
242     C     ABOVE FORMAT 3018  FOR PROBABILITIES OF GIVING
243     C     BIRTH PER YEAR FOR WOMEN OF AGE CLASSES 15 TO 44
244           READ (14, 3019) (CALAGE(ICALAG), ICALAG=1, 8)
245      3019 FORMAT(8F5.2)
246     C     ABOVE FORMAT 3019  FOR CALORIE FACTOR BY CALORIE
247     C     FACTOR AGE CLASS
248           READ (14, 3020) (PROAGE(IPROAG), IPROAG=1, 19)
249      3020 FORMAT(10F5.2, / 9F5.2)
250     C     ABOVE FORMAT 3020  FOR PROTEIN FACTOR BY PROTEIN
251     C     FACTOR AGE CLASS
252           READ (14, 3021) PMARRY, AGBRME, AGBRSD, PINDIM, PMIMIG,
253          1 ((PRIMAG(ISEX, IAGE), IAGE=1, 86), ISEX=1, 2)
254      3021 FORMAT(F6.3, 2F4.0, 2F6.3, / 10F6.3,/ 10F6.3, / 10F6.3, /
255          1 10F6.3, / 10F6.3, / 10F6.3, / 10F6.3, / 10F6.3, / 6F6.3,/
256          2 10F6.3, / 10F6.3, / 10F6.3, /
257          1 10F6.3, / 10F6.3, / 10F6.3, / 10F6.3, / 10F6.3, / 6F6.3)
258     C     ABOVE FORMAT 3021  FOR PROBABILITY PER YEAR THAT
259     C     A SINGLE LOT OWNER MARRIES, AGE OF BRIDE MEAN, AGE OF BRIDE SD,
260     C     PROBABILITY THAT A LOT WILL RECEIVE AN INDIVIDUAL IMMIGRANT PER
261     C     YEAR, AND THE PROBABILITY THAT ANY INDIVIDUAL IMMIGRANT RECEIVED
262     C     WILL BE OF A GIVEN SEX AND AGE CLASS
263           READ (14, 3022) CALMIN, PROMIN, ANPMIN, CHPCMI, CHPPMI, CLLMAX
264      3022 FORMAT(F5.0, 2F5.1, 2F8.2, F5.2)
265     C     ABOVE FORMAT 3022  FOR CALORIE MINIMUM STANDARD
266     C     (KCAL/PERSON/DAY), TOTAL PROTEIN MINIMUM STANDARD (GRAMS EGG
267     C     PROTEIN EQUIVALENT/PERSON/DAY), ANIMAL PROTEIN MINIMUM STANDARD
268     C     (GRAMS/PERSON/DAY), CASH PER CAPITA MINIMUM STANDARD (CRUZ.(1975)/
269     C     PERSON/MONTH), CASH PER FAMILY MINIMUM STANDARD (CRUZ,(1975)/FAM./
270     C     MO), CLEARED PROPORTION OF LOT MAXIMUM STANDARD.
271           READ (14, 3023) (CALREQ(ICRAGE), ICRAGE=1, 25)
272      3023 FORMAT(13F5.0, / 12F5.0)
273     C     ABOVE FORMAT 3023  FOR CALORIE REQUIREMENT BY
274     C     CALORIE REQUIREMENT AGE.
275           READ (14, 3024) (PROREQ(IPRAGE), IPRAGE=1, 8)
276      3024 FORMAT(8F5.1)
277     C     ABOVE FORMAT 3024  FOR MEAN PROTEIN REQUIREMENT
278     C     IN GRAMS TOTAL PROTEIN EGG PROTEIN EQUIVALENTS PER PERSON PER DAY
279     C     BY PROTEIN REQUIREMENT AGE CLASS.
280           READ (14, 3025) (CALOR(ITEM), TOTPRO(ITEM), ANIPRO(ITEM), ITEM=1,
281          1 17)
282      3025 FORMAT(F6.1, 2F6.3)
283     C     ABOVE FORMAT 3025  FOR CALORIE CONTENT (KCAL/KG),
284     C     TOTAL PROTEIN CONTENT (KG EGG EQUIV./KG), AND ANIMAL PROTEIN
285     C     CONTENT (KG/KG) OF THE 17 PRODUCT "ITEMS".
286     C
287           READ (14, 3008) BASEPY,(YREFF(I), I=1,5), PACOEF, PACONS, PACHIP,
288          1 WGPTDN, TDNPDM
289      3008 FORMAT(F8.1, 7F5.2, F6.2, 2F5.2)
290     C     ABOVE FORMAT 3008 : BASE PASTURE YIELD (KG DRY
291     C     WEIGHT/HA/YR FOR VARIETY AT 2 PPM PHOSPHORUS), YEAR EFFECT (PROP.
292     C     OF FIRST YEAR YIELD FOR 5 YEARS), COEFFICIENT OF PASTURE YIELD ON
293     C     PHOSPHORUS REGRESSION, CONSTANT TERM OF PASTURE YIELD ON PHOSPHORUS
294     C     REGRESSION.
295           READ (14, 3009) ELLIM(1), ELLIM(2), (((DOSECA(IELC, LEVC, IYCC),
296          1 IYCC = 1,3), LEVC =1,2), IELC=1,4),(((DOSEPE(IELP, LEVP, IYCP),
297          2 IYCP = 1,4), LEVP = 1,2), IELP = 1,4),(PRICFE(IFER), IFER=1,5),
298          3 (PFERT(IPER), IPER=1,2), SLOLI, CONSLI, ALLIME, SLOPHO, CONPHO
299      3009 FORMAT(2F6.1, / 4(6F5.0 /), 4(8F5.0 /), 5F7.2, / 2F6.3, F9.6,
300          1F6.3, F5.0, F7.4, F6.2)
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C     ABOVE FORMAT 3009  FOR ELEMENT LIMITS FROM FERTILIZATION
C     FOR PHOSPHORUS AND PH, FERTILIZER DOSES FOR CACAO AND FERTILIZER DOSES FOR
C     PEPPER (ELEMENT CODES:  1=PHOS 2=POTAS 3=NITRO 4=MANEUR;  LEVEL OF SOIL
C     NUTRIENT CODES: 1=LOW 2=HIGH;  YEAR CLASS CODES FOR CACAO: 1=FIRST 2=SECOND
C     3=THIRD OR HIGHER;  YEAR CLASS CODES FOR PEPPER:  1=FIRST 2=SECOND
C     3=THIRD 4=FOURTH OR HIGHER), PRICES OF FERTILIZERS (FERTILIZER CODES:
C     1=LIME 2=PHOS 3=POTAS 4=NITRO 5=MANEUR), PROBABILITY OF FERTILIZATION
C     (PERENIAL CROP CODES: 1=CACAO 2=PEPPER), SLOPE OF LIME REGRESSION,
C     CONSTANT TERM OF LIME REGRESSION, LIME DOSE PER UNIT (ME/100G) OF
C     ALUMINUM, SLOPE OF PHOSPHORUS REGRESSION, CONSTANT OF PHOS. REGRESSION
      READ (14, 3006) FINLME, FINLSD, FICOME, FICOSD,
     1(PREINL(ICM), ICM=1,12)
 3006 FORMAT(2F4.0, 2F5.0, 12F5.2 )
C     ABOVE FORMAT 3006 : FINANCING LABOR LOSS (DAYS)
C     STANDARD DEVIATION OF SAME, FINANCING COST MEAN (1975 CRUZEIROS),
C     STD. DEV. OF SAME, AND PROPORTION OF FINANCING AQUISITION LABOR
C     LOSS BY CALENDAR MONTH.
      READ (14, 3007) DEPREC
 3007 FORMAT(F5.2)
C     ABOVE FORMAT 3007  FOR DEPRECIATION RATE FOR
C     CAPITAL GOODS (PROPORTION OF VALUE LOST PER YEAR)
      READ (14, 3026) SWTYPR, VITYPR
 3026 FORMAT(2F6.3)
C     ABOVE FORMAT 3026  FOR SWEET MANIOC TYPE
C     PROBABILITY
C     (PROBABILITY THAT SWEET AS OPPOSED TO BITTER IS THE TYPE OF
C     MANIOC PLANTED
C     IN A GIVEN LOT AND YEAR, GIVEN THAT MANIOC IS PLANTED), AND VIGNA TYPE
C     PROBABILITY (PROBABILITY THAT VIGNA IS THE TYPE OF BEANS PLANTED
C     IN A GIVEN LOT AND YEAR GIVEN THAT BEANS ARE PLANTED).
      READ (14, 3039) (COLAB(ICMO), ICMO=1,12)
 3039 FORMAT(12F6.1)
C     ABOVE FORMAT 3039  FOR COST OF LABOR IN
C     CRUZEIROS OF JAN. 1, 1975 PER MAN DAY BY CALENDAR MONTH.
      READ (14, 3040) (BUYME(IPROD), BUYSD(IPROD), SELLME(IPROD),
     1 SELLSD(IPROD), IPROD=1,17)
 3040 FORMAT(4F6.2)
C     ABOVE FORMAT 3040  FOR BUYING AND SELLING
C     PRICES MEAN AND STANDARD DEVIATION FOR EACH PRODUCT IN
C     CRUZEIROS OF JAN 1, 1975 PER KG.
      READ (14, 3041) CONMAX
 3041 FORMAT(F5.1)
C     ABOVE FORMAT 3041  FOR MAXIMUM
C     YEARS OF CONTINUOUS CULTIVATION (INCLUDING ANNUAL
C     CROPS, PERENNIAL CROPS, BARE AND WEEDS) BEFORE A
C     NEW CROP CANNOT BE PLANTED WITHOUT AN INTERVENING
C     FALLOW PERIOD (>240 DAYS) DUE TO WEEDS.
      READ (14, 3042) PCRECD, CRECME, CRECSD, PCSENT, CSENME, CSENSD
 3042 FORMAT(2(F6.3, 2F6.0))
C     ABOVE FORMAT 3042  FOR PROBABILITY
C    THAT CASH RECEIVED FROM OUTSIDE, MEAN AND
C     STANDARD DEVIATION OF AMOUNT RECEIVED IF SOME RECEIVED;
C     PROBABILITY CASH SENT TO OUTSIDE, MEAN AND STANDARD
C     DEVIATION OF AMOUNT SENT IF SOME SENT.
      READ (14, 6000) (PSELLB(ICROP), ICROP=1,10)
 6000 FORMAT(10F5.2)
C     ABOVE FORMAT 6000 *: PROBABILITY OF SELLING
C     EACH PRODUCT TO THE BANK OF BRASIL
      READ (14, 6003) PHVOLP, PPLPAY
 6003 FORMAT(2F5.2)
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C      ABOVE FORMAT 6003 : PROBABILITY OF VOLUNTARY
C      PAYMENT OF BANK (GIVEN SUBSISTENCE CASH NEED SATISFIED),
C      AND PROBABILITY OF PRIVATE LOAN PAYMENT GIVEN SUBSISTENCE NEED
C      SATISFIED
       READ (14, 6002) (SEED(ICR), ICR=1,4), TRANME, TRANSD, BTRCME,
      1 BTRCSD
 6002 FORMAT(2F5.2, 2F5.1)
C      ABOVE FORMAT 6002 : SEED PLANTING REQUIREMENT
C      (KG / HA) FOR THE 4 SUBSISTENCE SEED CROPS, MEAN TRANSPORTATION
C      COST (1975 CRUZEIROS / KG), STANDARD DEVIATION OF SAME, COST OF
C      BANK TRIPS FOR SALE OF CROPS (1975 CRUZEIROS / HARVEST), AND
C      STANDARD DEVIATION OF SAME.
       READ (14, 6004) CHICMZ, CWASTE
 6004 FORMAT(F7.4, F6.3)
C      ABOVE FORMAT 6004 :  CHICKEN HARVESTED FROM
C      MAIZE CONVERSION (KG LIVE WEIGHT CHICKENS / KG MAIZE FEED), AND
C      CHICKEN WASTAGE FACTOR (KG DRESSED MEAT / KG LIVE WEIGHT).
       READ (14, 6005) TUBCAL, TUBTP
 6005 FORMAT(2F8.2)
C      ABOVE FORMAT 6005  FOR TUBER CALORIES
C      (1000 CAL/CAPITA/YR FROM TUBERS), AND TUBER PROTEIN
C      (G PROTEIN/CAPITA/YR FROM TUBERS)
       READ (14, 6006) (BURNPR(IBT), IBT=1,3)
 6006 FORMAT(3F6.3)
C      ABOVE FORMAT 6006  FOR PROBABILITY OF
C      BURNING BY BURN TYPE (1=VIRGIN  2=SECOND GROWTH  3=WEED)
       IF (LOTS .GT. LTSMAX) GO TO 200
       GO TO 202
  200 WRITE (6, 1004) LTSMAX
 1004 FORMAT(1X, 'ERROR: NO. OF LOTS EXCEEDS DIMENSION OF ', I5)
       GO TO 201
  202 WRITE (6, 1005)
 1005 FORMAT(1X, 'ENTER NO. OF PATCHES PER LOT (FORMAT=I3)')
       READ (5, 1002) NOPCHS
 1002 FORMAT(I3)
       IF (NOPCHS .GT. NPMAX) GO TO 203
       WRITE (6, 1011)
 1011 FORMAT(1X, 'ENTER OUTPUT REQUEST: 1=PLOT AND LIST, ',
      1 '2=LIST ONLY',/
      1 3X, '(FORMAT=I1)')
       READ (5, 1012) IOUTPT
 1012 FORMAT(I1)
       WRITE(6, 3032)
 3032 FORMAT(1X, 'ENTER LAND USE OUTPUT REQUEST:  1=YES 2=NO (FMT=I1)')
      .  READ (5, 1012) LUOUTP
       GO TO 204
  203 WRITE (6, 1006) NPMAX
 1006 FORMAT(1X, 'ERROR: NO. OF PATCHES EXCEEDS DIMENSION OF ', I5)
       GO TO 201
  204 CONTINUE
       WRITE (6, 3027)
 3027 FORMAT(1X, 'ENTER SIZE OF LOT IN HECTARES (FMT=F4.0)')
       READ (5, 3028) SIZLOT
 3028 FORMAT(F4.0)
       WRITE (6, 3029)
 3029 FORMAT(1X, 'ENTER SEED ("0" OR ODD) FOR RANDOM NO. GENERATION',/
      1 1X, '("0" FOR AUTOMATIC),  FMT=I7')
       READ (5, 3030) INIT
 3030 FORMAT(I7)
       SIZPCH = SIZLOT / FLOAT(NOPCHS)
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421           WRITE (9, 8001) NORUN, LOTS, NOPCHS, SIZLOT, SIZPCH, INIT, IYEARS,
422          1 IFREEZ, ISTOCH
423       8001 FORMAT(1X, 'RUN NO. = ', I3, / 1X, 'NUMBER OF LOTS = ', I3, /
424          1 1X, 'PATCHES PER LOT = ', I4, / 1X, 'LOT SIZE = ', F5.1, 1X,
425          2 'HA.', / 1X, 'PATCH SIZE = ', F6.3, 1X, 'HA.', /
426          3 1X, 'INITIAL VALUE FOR RANDOM NO. = ', I7, / 1X,
427          3 'NO. OF YEARS IN RUN = ', I3, / 1X,
428          4 'POPULATION SECTOR CODE (1=FROZEN 2=DYNAMIC) = ', I2, /
429          5 1X, 'RUN TYPE (1=DETERMINISTIC 2=STOCHASTIC) = ', I2,1X,
430          6 /1X,/1X,/ 1X,'YEAR', 2X, 'PCFAIL')
431     C     INITIALIZATION OF DISEASES: LAST YEARS IN EACH PATCH AND
432     C     ESTABLISHMENT IN AREA
433           DO 210 ILT = 1, LOTS
434           DO 210 IPAT = 1, NOPCHS
435           IBPOD(ILT, IPAT) = 0
436           IWBROO(ILT, IPAT) = 0
437         210 IFUSAR(ILT, IPAT) = 0
438           IWBEST = 1
439           IFUEST = 1
440           IBPEST = 1
441     C     INITIALIZATION OF VIRGIN, SECOND GROWTH AND WEED
442     C     BURN QUALITY LAST LOT AND LAST YEAR INDICATORS
443           LLOTV = 0
444           LYRV = 0
445           LLOTSG = 0
446           LYRSG = 0
447           LLOTW = 0
448           LYRW = 0
449     C     INITIALIZATION OF COUNTERS IN MEASUR FOR K STANDARDS
450           CALL MEASUR(1,4,0.)
451           DO 100 I1 = 1, LOTS
452     C     INITIALIZATION OF HUNTER AND LAND USE PATTERN CLASSIFICATION
453           IHUNT(I1) = 0
454           LUPAT(I1) = 0
455     C     ALL ORIGINAL COLONISTS BEGIN AS SOLVENT
456           IORIG(I1) = 1
457           ISOLV(I1) = 1
458     C     INITIALIZATION OF ALL LOTS AS COMPLETELY UNCLEARED
459           AREACL(I1) = 0.
460           CAPIT(I1) = 0.
461           CGOODS(I1) = 0.
462           CAPENT(I1) = 0.
463           CGOENT(I1) = 0.
464           CGOCON(I1) = 0.
465           CAPCON(I1) = 0.
466     C     AMOUNT, DATE AND TYPE OF ALL LOANS INITIALIZED AT ZERO
467           DO 250 LONO = 1, MAXNLO
468           AMTLO(I1, LONO) = 0.
469           LOANDA(I1, LONO) = 0.
470         250 LOANTY(I1, LONO) = 0
471     C     "IYR" SET AT 1 FOR USE IN LOANG
472           IYR = 1
473     C     ALL COLONISTS GET INCRA SALARY, ETC. (LOAN TYPE 4) PLUS A CHANCE
474     C     AT FINANCING FOR CAPITAL GOODS SUCH AS POWER SAWS (LOAN TYPE 5)
475           CALL LOANG(I1, 4, 0)
476           XRAN = ABAND(INIT, -1.)
477           IF (XRAN .LT. PRFIN(5)) CALL LOANG(I1, 5, 0)
478     C     ALL COLONISTS GET FINANCED HOUSE AND LAND (LOAN TYPE 1)
479           CALL LOANG(I1, 1, 0)
480           DO 360 IPR=1,4
```

```
481     C     INITIALIZATION OF SEED STORED
482       360 SEEDST(I1, IPR) = 0.
483         DO 101 I2 = 1, NOPCRS
484     C     INITIAL SOIL QUALITY GENERATION
485         CALL INITSQ(I1, I2)
486     C     INITIALIZATION OF ALL LAND AS VIRGIN
487         LUSE(I1, I2) = 1
488     C     INITIALIZATION OF ALL UTCOM USE CODES
489     C     DURATION AS ZERO
490         IDUR(I1, I2) = 0
491     C     INITIALIZE CONTINUOUS CULTIVATION COUNTERS AS ZERO
492         CONTIN(I1, I2) = 0.
493     C     INITIALIZE ALL UTCOM CODES AS "NO CATEGORY"
494         LASTUS(I1, I2) = 1
495       101 CONTINUE
496         CALL POPGEN(I1, IFREEZ)
497       100 CONTINUE
498         DO 102 IYR = 1, IYEARS
499     C     INITIALIZATION OF SALE GAME POOL FOR COMMUNITY
500         SMEAT = 0.
501         IHEAD1 = 1
502         ARPOP = 0.
503         ORIGS = 0.
504     C     INITIALIZATION OF LAND USE OUTPUT MEASURES
505     C     FOR 3 ITEMS AND 12 LAND USES
506         DO 352 LUIT = 1,3
507         DO 352 LUOM = 1,12
508       352 USEOUT(LUIT, LUOM) = 0.
509     C     INITIALIZATION OF COMBINED PROB. OF COLONIST FAILURE
510         PCFAIL = 0.
511         FAILSU = 0.
512     C     WEATHER GENERATION
513         CALL WEAGEN
514     C     TECHNOLOGY IMPROVEMENT ADJUSTMENTS IN BASE YIELDS
515         CALL TECHNO
516     C     DETERMINATION OF CACAO OR PEPPER DISEASES
517         CALL CDISEA
518     C     DETERMINATION OF BUYING AND SELLING PRICES FOR YEAR
519         CALL PRICES
520         DO 357 LT=1,LOTS
521     C     INITIALIZATION OF CONSUMPTION CASH (CORRESPONDS TO THE SPENDING
522     C     OF THE PREVIOUS YEAR'S CONSUMPTION CASH)
523       357 CAPCON(LT) = 0.
524     C     LAND USE ALLOCATION
525         CALL LUALLO(IYR)
526         DO 103 LOT = 1, LOTS
527     C     INITIALIZATION OF KG OF PRODUCTS EATEN AND PRESENT IN LOT
528         DO 350 IPROD = 1,17
529         EAT(IPROD) = 0.
530       350 PRES(IPROD) = 0.
531     C     ASSIGNMENT OF GAME EATEN IN LOT
532     C     (CALCULATED IN SUBROUTINE HUNT) AS GAME EATEN
533         EAT(14) = EATGAM(LOT)
534     C     INITIALIZATION OF LOT USE COUNTER FOR 12 LAND USES MONITORED IN
535     C     LAND USE OUTPUT
536         DO 351 LUCOUN = 1,12
537       351 LOTUSE(LUCOUN) = 0
538     C     INITIALIZATION OF AREA COUNTERS USED IN PRALLO FOR
539     C     SEED NEED CALCULATIONS
540         DO 356 IUP = 1,10
```

```
541       356 AREA(IUP) = 0.
542      C    INITIALIZATION OF CROP CALL CODES FOR YIELD SUBROUTINE CALLS
543           DO 361 ICCC = 1, 11
544       361 ICHCAL(ICCC) = 0
545      C    INITIALIZATION OF COMBINED PROB. OF COLONIST FAILURE COUNTER
546           FAILED = 0.
547           DO 104 IPCH = 1, NOPCHS
548      C    VIRGIN PATCHES SKIPPED
549           IF (LUSE(LOT, IPCH) .EQ. 1) GO TO 104
550      C    EROSION CALCULATION
551           CALL EROSN(LOT, IPCH)
552      C    SOIL CHANGE
553           CALL SOILCH(LOT, IPCH)
554      C    YIELD CALCULATIONS  AND LOT PRODUCTION
555           CALL LOTPRO(LOT, IPCH)
556       104 CONTINUE
557      C    DEPRECIATION OF CAPITAL GOODS VALUE
558           CGOENT(LOT) = CGOENT(LOT) * (1.-DEPREC)
559           CGOODS(LOT) = CGOODS(LOT) * (1.-DEPREC)
560           CGOCON(LOT) = CGOCON(LOT) * (1.-DEPREC)
561      C    PRODUCT ALLOCATION
562           CALL PRALLO(LOT)
563      C    POPULATION
564           CALL POPUL(LOT, IFREEZ)
565      C    MEASUREMENT OF NUTRITION AND LAND CLEARING FOR CARRYING CAPACITY STANDARDS
566           CALL MEASUR(LOT, 1, 0.)
567      C    DETERMINATION OF FAMILY UNIT EMMIGRATION
568           IF (IFREEZ .GE. 2) CALL LEAVE(LOT, IFREEZ)
569      C    SUMMATION OF POPULATION AND NUMBER OF ORIGINAL COLONISTS REMAINING
570           ARPOP = ARPOP + FAMSIZ(LOT)
571           IF (IORIG(LOT) .EQ. 1) ORIGS = ORIGS + 1.
572           FAILSU = FAILSU + FAILED
573       103 CONTINUE
574      C    PROBABILITY OF COLONIST FAILURE ON ANY CRITERION
575           PCFAIL = FAILSU / FLOAT(LOTS)
576           WRITE (9, 8000) IYR, PCFAIL
577      8000 FORMAT(I3, 4X, F7.3)
578      C    YEARLY TOTALS OF CARRYING CAPACITY MEASURES
579           CALL MEASUR(1, 3, 0.)
580      C    LAND USE OUTPUT CALCULATIONS FROM TOTALS SUMMED IN LOTPRO
581           DO 353 ILU = 1,12
582      C     MISSING YIELDS SET AT -99.
583           IF (USEOUT(1, ILU) .LE. 0.01) USEOUT(3, ILU) = -99.
584      C     MISSING YIELDS SET AT -99.
585           IF (USEOUT(1, ILU) .LE. 0.01) USEOUT(3, ILU) = -99.
586           IF (USEOUT(1, ILU) .LE. 0.01) GO TO 354
587      C    AREA-WIDE AVERAGE YIELD FOR EACH LAND USE
588      C    (IN THE CASE OF MANIOC THIS REPRESENTS THE YIELD
589      C    PER HECTARE PER YEAR GROWTH FOR THE PATCHES HARVESTED ONLY)
590           USEOUT(3, ILU) = USEOUT(3, ILU) / USEOUT(1, ILU)
591      C    PROPORTION OF STUDY AREA IN EACH LAND USE
592      C    (IN THE CASE OF MANIOC THIS REPRESENTS THE PROPORTION
593      C    OF AREA WHICH IS HARVESTED MANIOC)
594       354 USEOUT(1, ILU) = USEOUT(1, ILU) / FLOAT(LOTS * NOPCHS)
595      C    PROPORTION OF LOTS WITH LAND USE (IN THE CASE OF MANIOC THIS REPRESENTS THE
596      C    HARVESTED AREA)
597       353 USEOUT(2, ILU) = USEOUT(2, ILU) / FLOAT(LOTS)
598      C    OUTPUT OF LAND USE AREA-WIDE MEASURES
599           DO 355 LUOCR = 1,3
600           LOCBEG = LUOCR * 4 - 3
```

```
      LUCEND = LUOCR * 4
  355 WRITE (15, 3036) NORUN, IYR, ((USEOUT(LUOIT, LUC), LUOIT=1,3),
     1 LUC=LUCBEG, LUCEND)
 3036 FORMAT(I3, I5, 4(2F6.3, F6.0))
C     ABOVE FORMAT 3036 FOR FILE OUTPUTFILE 3 (LAND USE MEASURES LIST)
C     CALCULATION OF AREA, POPULATION DENSITY AND PROPORTIONS OF
C     COLONISTS REMAINING
      STDRD(13, IYR) = ARPOP / (SIZLOT * FLOAT(LOTS) / 100.)
      STDRD(14, IYR) = ORIGS / FLOAT(LOTS)
      IF (IOUTPT .GT. 2) GO TO 102
      IF (IYR .GT. 1) GO TO 211
      WRITE (13, 3035) NORUN
 3035 FORMAT(1X, 'RUN NUMBER', 1X, I3, 1X, / 1X, / 1X)
      WRITE (13, 1009)
 1009 FORMAT(1X, 'YEAR  PROPORTION OF LOTS BELOW MINIMUM STANDARD', 6X,
     1 'PROP.   PROP.   AREA  AVERAGES', 30X, 'POP    PROP.', / 1X,
     2 26('- '),1X, 'OVER', 4X, 'TOTAL', 3X, 22('- '), 'DENS    ORIG', /
     3 7X, 'CALORIES  TOT.PROT  ANIMAL', 3X, 'CASH/MO  MIN WAGE', 1X,
     4 '50 %', 4X, 'AREA.   CALORIES  TOT.PROT', 2X, 'AN.PROT', 1X,
     5 'CASH/MO   MIN', 3X, 'PER    COLS', / 7X, 'PER CAP.  PER CAP.',
     6 2X, 'PROT.PC  PER CAP. PER FAM  CLEAR   CLEAR', 3X, 'PER CAP.',
     7 2X, 'PER CAP.  PER CAP.PER CAP', 3X, 'WAGE  SQ.KM  REMAIN', / 1X)
  211 WRITE (13, 1010) IYR, (STDRD(ITEM, IYR), ITEM=1, 14)
 1010 FORMAT(1X, I4, 2X, F6.3, 5X, 4(F6.3, 3X), 2(F6.3, 2X), F6.0, 4X,
     1 F6.1, 4X, F6.1, 2X, F8.2, 2X, F6.3, F6.2, F6.3)
C     SOIL QUALITY OUTPUT
      CALL SQOUT(NORUN)
  102 CONTINUE
      IF (IOUTPT .EQ. 2) GO TO 201
      CALL OUTPUT(IYEARS, NORUN)
  201 CONTINUE
      RETURN
      END
END OF FILE
```

MAINT

Purpose:	maintenance: adjusts labor and capital resources for maintenance of pasture, animals, and perennial crops already established in the lot.
Kind of routine:	subroutine
Arguments:	LOT lot number
COMMON areas:	COLON, FLAB, SIZES, REQUIR, USECOM, COSTS, FERT, RANDOM, SOIL
Routines called:	ARAND
Routine called by:	LUALLO
Program size:	3016 bytes

```
      SUBROUTINE MAINT(LOT)
C     MAINTENANCE SUBROUTINE: ADJUSTS LABOR AND CAPITAL RESOURCES FOR
C     MAINTENANCE OF PASTURE, ANIMALS AND PERENNIAL CROPS ALREADY
C     ESTABLISHED IN THE LOT.
      REAL*8 DLOG
      DOUBLE PRECISION ELLIM, PHOS, PH, AL, NITRO, CARB, CLAY,
     1 SLOPE
      COMMON/FERT/ ELLIM(2), DOSECA(4, 2, 3), DOSEPE(4, 2, 4),
     1 PRICFE(5), PFERT(2), SLOLI, CONSLI, ALLIME, SLOPHO, CONPHO,
     2 IFERT(10,100)
      COMMON/RANDOM/ INIT
      COMMON/SOIL/PHOS(10,100), PH(10,100), AL(10,100),
     1 NITRO(10,100), CARB(10,100), CLAY(10,100), SLOPE(10,100)
      COMMON/SIZES/ LOTS, NOPCHS, SIZLOT, SIZPCH
      COMMON/COLON/ LUPAT(10), CAPIT(10), CGOODS(10), AREACL(10),
     1 FAMLAB(10), MALES(10), FAMSIZ(10), CGOENT(10), CAPCON(10),
     2 MORTYP(10), IORIG(10), CGOCON(10), CAPENT(10)
      COMMON/FLAB/ FLTOT(12), FLMALE(12), LABCAL
      COMMON/REQUIR/ REQTL(12, 15), REQML(12, 15), REQFC(12, 15)
      COMMON/USECOM/ LUSE(10,100), IDUR(10,100), LASTUS(10,100),
     1 CONTIN(10,100)
      COMMON/COSTS/ COLAB(12), BUYEE(17), BUYSD(17), SELLME(17),
     1 SELLSD(17)
      EXTERNAL AMAND
C     INITIALIZATION OF CACAO AND PEPPER FERTILIZATION INDICATORS
      ICACF = 0
      IPIMF = 0
      DO 100 IP = 1, NOPCHS
      IPCH = IP
      IOP = 0
      IFERT(LOT, IP) = 0
      IF (LUSE(LOT, IP) .LE. 17) GO TO 100
      IF (LUSE(LOT, IP) .EQ. 18) IOP = 14
      IF (LUSE(LOT, IP) .EQ. 19) GO TO 100
      IF (LUSE(LOT, IP) .EQ. 20) IOP = 12
      IF (LUSE(LOT, IP) .EQ. 21) IOP = 13
      IF (LUSE(LOT, IP) .EQ. 22) GO TO 100
      IF (LUSE(LOT, IP) .EQ. 23) IOP = 15
      IF (LUSE(LOT, IP) .EQ. 24) GO TO 100
C     ADJUSTMENT OF LABOR AND CAPITAL FOR MAINTENANCE:  NOTE THAT
C     ESTABLISHED CROPS ARE ALWAYS ASSUMED TO BE MAINTAINED (AFTER
C     SATISFYING SUBSISTENCE NEEDS) REGARDLESS OF LABOR AND CAPITAL
C     "FEASABILITY".
      DO 101 MOC = 1, 12
      FLTOT(MOC) = FLTOT(MOC) - REQTL(MOC, IOP) * SIZPCH
      FLMALE(MOC) =FLMALE(MOC) - REQML(MOC, IOP) * SIZPCH
      CAPIT(LOT) = CAPIT(LOT) - REQFC(MOC, IOP) * SIZPCH
      IF (FLTOT(MOC) .LT. 0. .OR. FLMALE(MOC) .LT. 0.) GO TO 102
      GO TO 101
  102 CONTINUE
C     CALCULATION OF LABOR DEFICIT
      DEFIC = AMIN1(FLTOT(MOC), FLMALE(MOC))
      CAPIT(LOT) = CAPIT(LOT) + DEFIC * COLAB(MOC)
      FLTOT(MOC) = FLTOT(MOC) - DEFIC
      FLMALE(MOC) = FLMALE(MOC) - DEFIC
  101 CONTINUE
      IF (IOP .GE. 14) GO TO 100
C     ASSIGNMENT OF YEAR CLASS FOR FERTILIZER DOSE CALCULATIONS
      IYRCL = 4
      IF (IOP .EQ. 12) IYRCL=3
```

```
      IF (IDUR(LOT, IPCH) .LE. 730) IYRCL = 2
      IF (IDUR(LOT, IPCH) .LE. 365) IYRCL = 1
C     ASSIGNMENT OF PHOSPHORUS LEVEL FOR FERTILIZER DOSE CALCULATIONS
      LEVP = 2
      IF (PHOS(LOT, IPCH) .LE. 10.) LEVP = 1
      IF (IOP .EQ. 12 .AND. ICACP .LE. 1) GO TO 200
      IF (IOP .EQ. 13 .AND. IPIMP .LE. 1) GO TO 201
      GO TO 100
  201 CONTINUE
C     DECISION FOR PEPPER FERTILIZATION (MADE ONCE FOR LOT AND YEAR)
      IF (IPIMP .EQ. 1) GO TO 204
      XRAN = ARAND(INIT, -1.)
      IF (XRAN .LT. PFERT(2)) GO TO 204
C     INDICATOR THAT PEPPER NOT FERTILIZED FOR LOT AND YEAR
      IPIMP = 2
      GO TO 100
  204 CONTINUE
C     INDICATOR THAT PEPPER IS TO BE FERTILIZED
      IPIMP = 1
      IPEREN = 2
C     FOR PEPPER
      COSTP = SIZPCH * (DOSEPE(1, LEVP, IYRCL) * PRICFE(2) +
     1 DOSEPE(2, 1, IYRCL) * PRICFE(3) + DOSEPE(3, 1, IYRCL) +
     2 DOSEPE(4, 1, IYRCL) * PRICFE(5))
      IF (CAPIT(LOT) .LE. COSTP) GO TO 100
      CAPIT(LOT) = CAPIT(LOT) - COSTP
      PHOS(LOT, IPCH) = PHOS(LOT, IPCH) + SLOPHO *
     1 DOSEPE(1, LEVP, IYRCL) + CONPHO
      GO TO 203
  200 CONTINUE
C     DECISION FOR CACAO FERTILIZATION
      IF (ICACP .EQ. 1) GO TO 202
      XRAN = ARAND(INIT, -1.)
      IF (XRAN .LT. PFERT(1)) GO TO 202
C     INDICATOR THAT CACAO NOT TO BE FERTILIZED
      ICACP = 2
      GO TO 100
  202 CONTINUE
C     INDICATOR THAT CACAO IS TO BE FERTILIZED
      ICACP = 1
      IPEREN = 1
C     FOR CACAO
      COSTP = SIZPCH * (DOSECA(1, LEVP, IYRCL) * PRICFE(2) +
     1 DOSECA(2, 1, IYRCL) * PRICFE(3) + DOSECA(3, 1, IYRCL) *
     2 PRICFE(4) + DOSECA(4, 1, IYRCL) * PRICFE(5))
      IF (CAPIT(LOT) .LE. COSTP) GO TO 100
      CAPIT(LOT) = CAPIT(LOT) - COSTP
      PHOS(LOT, IPCH) = PHOS(LOT, IPCH) + SLOPHO *
     1 DOSECA(1, LEVP, IYRCL) + CONPHO
  203 CONTINUE
C     ADJUSTMENTS FOR EITHER CACAO OR PEPPER FERTILIZATION
C     LIMING DONE ONLY IN FIRST YEAR OF CROP
      IF (IYRCL .GE. 2) GO TO 300
      IF (AL(LOT, IPCH) .LE. 0.2) GO TO 300
      DOSELI = ALLIME * AL(LOT, IPCH)
      COSTL = DOSELI * PRICFE(1)
      IF (COSTL .GE. CAPIT(LOT)) GO TO 100
      CAPIT(LOT) = CAPIT(LOT) - COSTL
      PH(LOT, IPCH) = PH(LOT, IPCH) + DOSELI * SLOLI + CONSLI
      AL(LOT, IPCH) = 11.43 - 7.68 * DLOG(PH(LOT, IPCH)) -
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     1 6.27D-2 * CLAY(LOT, IPCH)
  300 CONTINUE
      IF (PH(LOT, IPCH) .GE. ELLIM(2)) PH(LOT, IPCH) = ELLIM(2)
      IF (PHOS(LOT, IPCH) .GE. ELLIM(1)) PHOS(LOT, IPCH) = ELLIM(1)
      IF (AL(LOT, IPCH) .LE. 0.) AL(LOT, IPCH) = 0.
C     INDICATOR OF FERTILIZATION (USED IN PEYLD FOR TEMPORARY CARBON LEVEL)
      IFERT(LOT, IPCH) = 1
  100 CONTINUE
      RETURN
      END
END OF FILE
```

MAXRA

Purpose:	maximum rainfall: returns day of the agricultural year on which the most rain fell in 24 hours.
Kind of routine:	function (integer)
Arguments:	IYR year of simulation
COMMON areas:	WEACOM
Routines called:	none
Routine called by:	USETOT
Program size:	566 bytes

```
      1            FUNCTION MAXRA(IYR)
      2      C     MAXIMUM RAINFALL FUNCTION: RETURNS DAY OF AGRICULTURAL YEAR ON
      3      C     WHICH MAXIMUM RAINFALL IN 24 HOURS OCURRED.
      4            COMMON/WEACOM/ RAIN(366), EVAP(366), RINSOL(366)
      5            MRCALD = 0
      6            MAXRA = 0
      7            RAINMA = 0.
      8            NDIYR = 365
      9            IF (MOD(IYR, 4) .EQ. 0) NDIYR = 366
     10            DO 100 ICALDA = 1, NDIYR
     11            IF (RAIN(ICALDA) .GE. RAINMA) GO TO 101
     12            GO TO 100
     13        101 CONTINUE
     14      C     IDENTIFICATION OF RAINFALL MAXIMUM (RANMA) AND MAXIMUM RAINFALL
     15      C     CALENDAR DAY (MRCALD)
     16            RAINMA = RAIN(ICALDA)
     17            MRCALD = ICALDA
     18        100 CONTINUE
     19      C     CONVERSION OF CALENDAR DAY TO AGRI. YR. DAY
     20            MAXRA = MRCALD + NDIYR - 182
     21            IF (MRCALD .GE. (NDIYR - 182)) MAXRA = MRCALD - NDIYR + 183
     22            RETURN
     23            END
END OF FILE
```

MEASUR

Purpose:	computes carrying capacity measures for comparison with standards
Kind of routine:	subroutine
Arguments:	LOT lot number ICALTY call type: 1=nutrition and clearing, 2=cash standard of living, 3=yearly totals, 4=initializations at beginning of run CASHPL cash per lot (Cruzeiros of Jan 1, 1975: lumped consumption and investment capital of all types)
COMMON areas:	DATE, SIZES, STAND, KMEAS, COLON, SUMMAR
Routines called:	none
Routine called by:	MAIN, PRALLO
Program size:	1534 bytes

```
      SUBROUTINE MEASUR(LOT, ICALTY, CASHPL)
C     MEASURES SUBROUTINE FOR COMPARING CARRYING CAPACITY INDICATORS
C     WITH STANDARDS.  ARGUMENTS: LOT, CALL TYPE (1=NUTRITION AND
C     CLEARING, 2=CASH STANDARD OF LIVING,  3=YEARLY TOTALS
C     4=INITIALIZATIONS AT BEGINNING OF RUN), AND CASH PER LOT.
      COMMON/DATE/ IYR
      COMMON/SIZES/ LOTS, NOPCHS, SIZLOT, SIZPCH
      COMMON/STAND/ CALMIN, PROMIN, ANPMIN, CHPFMI, CHPCMI, CLLMAX,
     1 STDRD(14, 50)
      COMMON/MEAS/ CALOPC, PROTPC, ANPRPC
      COMMON/COLON/ LUPAT(10), CAPIT(10), CGOODS(10), AREACL(10),
     1 FAMLAB(10), MALES(10), FAMSIZ(10), CGOENT(10), CAPCON(10),
     2 HOMTYP(10), IORIG(10), CGOCON(10), CAPENT(10)
      COMMON/SUMMAR/ FAILED
      GO TO (100, 101, 103, 104), ICALTY
      WRITE (6, 1000) ICALTY
 1000 FORMAT(1X,'ERROR: CALL TYPE', I5, 2X, 'NOT RECOGNIZED IN MEASUR')
      CALL SYSTEM
  100 CONTINUE
C     NUTRITION CALLS  (SECOND CALL FROM MAIN)
C     CALORIES PER CAPITA TOTAL
      CPCTOT = CPCTOT + CALOPC
C     CALORIES BELOW STANDARD
      IF (CALOPC .LT. CALMIN) CALBS = CALBS + 1.
      IF (CALOPC .LT. CALMIN) FAILED = 1.
C     TOTAL PROTEIN PER CAPITA TOTAL
      PPCTOT = PPCTOT + PROTPC
C     TOTAL PROTEIN BELOW STANDARD
      IF (PROTPC .LT. PROMIN) PROBS = PROBS + 1.
      IF (PROTPC .LT. PROMIN) FAILED = 1.
C     ANIMAL PROTEIN PER CAPITA TOTAL
      APPCT = APPCT + ANPRPC
C     ANIMAL PROTEIN PER CAPITA BELOW STANDARD
      IF (ANPRPC .LT. ANPMIN) ANPBS = ANPBS + 1.
      IF (ANPRPC .LT. ANPMIN) FAILED = 1.
C     CLEARING TOTAL
      CLTOT = CLTOT + AREACL(LOT)
C     CLEARING OF LOT ABOVE MAXIMUM STANDARD
      IF ((AREACL(LOT)/SIZLOT) .GE. CLLMAX) CLLOS = CLLOS + 1.
C     NUMBER OF CALLS
      CALLS = CALLS + 1.
      GO TO 900
  101 CONTINUE
C     CASH STANDARD OF LIVING (PER CAPITA 1975 CRUZEIROS/FAMILY/MONTH)
C     TOTALS  (CALL FROM PRALLO)
      IF (FAMSIZ(LOT) .LE. 0.1) GO TO 900
      CASHPC = CASHPL / FAMSIZ(LOT) / 12.
      CASTOT = CASTOT + CASHPC
      CPFTOT = CPFTOT + CASHPL / 12.
C     CASH PER CAPITA BELOW STANDARD
      IF (CASHPC .LT. CHPCMI) CHPCBS = CHPCBS + 1.
C     CASH PER FAMILY BELOW STANDARD  (CASPL IS PER YEAR; CHPFMI
C     IS PER MONTH)
      IF (CASHPL .LT. (CHPFMI * 12.)) CHPFBS = CHPFBS + 1.
      IF (CASHPL .LT. (CHPFMI * 12.)) FAILED = 1.
      GO TO 900
  103 CONTINUE
C     YEARLY TOTALS  (THIRD CALL FROM MAIN)
C     PROPORTION OF LOTS BELOW CALORIES PER CAPITA STANDARD
      STDRD(1, IYR) = CALBS / CALLS
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      C     PROPORTION OF LOTS BELOW TOTAL PROTEIN PER CAPITA STANDARD
            STDRD(2, IYR) = PROBS / CALLS
      C     PROPORTION OF LOTS BELOW ANIMAL PROTEIN PER CAPITA STANDARD
            STDRD(3, IYR) = ANPBS / CALLS
      C     PROPORTION OF LOTS BELOW CASH STANDARD OF LIVING PER CAPITA STD.
            STDRD(4, IYR) = CHPCBS / CALLS
      C     PROPORTION OF LOTS BELOW CASH STANDARD PER FAMILY STANDARD
            STDRD(5, IYR) = CHPFBS / CALLS
      C     PROPORTION OF AREA CLEARED
            STDRD(7, IYR) = CLTOT /(SIZLOT * FLOAT(LOTS))
      C     PROPORTION OF LOTS OVER CLEARED FRACTION MAXIMUM
            STDRD(6, IYR) = CLLOS / CALLS
      C     AREA AVERAGE CALORIES PER CAPITA IN LOTS
            STDRD(8, IYR) = CPCTOT / CALLS
      C     AREA AVERAGE TOTAL PROTEIN PER CAPITA
            STDRD(9, IYR) = PPCTOT / CALLS
      C     AREA AVERAGE ANIMAL PROTEIN PER CAPITA
            STDRD(10, IYR) = APPCT / CALLS
      C     AREA AVERAGE CASH STANDARD OF LIVING PER CAPITA
            STDRD(11, IYR) = CASTOT / CALLS
      C     AREA AVE. CASH STANDARD OF LIVING PER FAMILY (PROP. OF STANDARD)
            STDRD(12, IYR) = CPFTOT / CALLS / CHPFMI
        104 CONTINUE
      C     INITIALIZATIONS FOR FIRST CALL OF RUN AND AFTER EACH YEAR
      C     (FIRST AND THIRD CALLS FROM MAIN)
            CPCTOT = 0.
            CALBS = 0.
            PPCTOT = 0.
            PROBS = 0.
            APPCT = 0.
            ANPBS = 0.
            CALLS = 0.
            CASHPC = 0.
            CASTOT = 0.
            CPFTOT = 0.
            CHPCBS = 0.
            CHPFBS = 0.
            CLTOT = 0.
            CLLOS = 0.
        900 CONTINUE
            RETURN
            END
END OF FILE
```

MZYLD

Purpose:	maize yield
Kind of routine:	subroutine
Arguments:	LOT lot number
	IPCH patch number
COMMON areas:	SOIL, USECOM, RANDOM, YIELDS, TECHN
Routines called:	ARAND, BRAND
Routine called by:	LOTPRO
Program size:	2566 bytes

```
      SUBROUTINE MZYLD(LOT, IPCH)
C     MAIZE YIELD SUBROUTINE
      DOUBLE PRECISION BRAND
      DOUBLE PRECISION PHOS, PH, AL, NITRO, CARB, CLAY, SLOPE,
     1 PHADJ, PRYLME, PRYL, DMZ, DRI, VBLTYD
      COMMON/SOIL/ PHOS(10,100), PH(10,100), AL(10,100),
     1 NITRO(10,100), CARB(10,100), CLAY(10,100), SLOPE(10,100)
      COMMON/USECOM/ LUSE(10,100), IDUR(10,100), LASTUS(10,100),
     1 CONTIN(10,100)
      COMMON/RANDOM/ INIT
      COMMON/YIELDS/ YLDRI, YLDMZ, YLDPS, YLDVI, YLDBN, YLDSM, YLDPE,
     1 YLDCA, YLDPA
      COMMON/TECHN/ TECH(9), START(9)
      COMMON/YLDCAL/ ICRCAL(11)
      DIMENSION DMZ(4), DMN(4), DRI(4)
      EXTERNAL ARAND, BRAND
C     INTERPLANTED CROP DENSITY ASSIGNMENT
      LU = LUSE(LOT, IPCH)
      IF (LU .EQ. 7) GO TO 105
      GO TO 104
  105 CONTINUE
C     MAIZE ALONE
C     CROP CODE
      ICCO = 3
C     DENSITY CODE (1=ALONE 2=WITH RICE  3=WITH MANIOC 4=WITH OTHER)
      IDC = 1
      IF (ICRCAL(3) .EQ. 1) GO TO 103
C     FIRST CALL FOR MAIZE ALONE
      DMZ(1) = BRAND(4.344D3, 6.275D3)
      IF (DMZ(1) .LE. 0.) DMZ(1) = 0.
      DRI(1) = 0.
      DMN(1) = 0.
      GO TO 103
  104 CONTINUE
C     INTERPLANTED CROP DENSITY ASSIGNMENT
      LU = LUSE(LOT, IPCH)
      IF (LU .EQ. 6 .OR. LU .EQ. 15 .OR. LU .EQ. 17) GO TO 100
      GO TO 101
  100 CONTINUE
C     FOR INTERPLANTED RICE
C     CROP CALL CODE
      ICCO = 4
C     DENSITY CODE
      IDC = 2
      IF (ICRCAL(4) .EQ. 1) GO TO 101
C     FIRST CALL FOR MAIZE WITH RICE
      DMZ(2) = BRAND(3.4444D3, 3.507D3)
      IF (DMZ(2) .LE. 0.) DMZ(2) = 0.
      DRI(2) = BRAND(1.18D5, 1.26D5)
      IF (DRI(2) .LE. 0.) DRI(2) = 0.
      DMN(2) = 0.
  101 CONTINUE
      IF (LU .EQ. 14 .OR. LU .EQ. 15 .OR. LU .EQ. 17) GO TO 102
      GO TO 106
  102 CONTINUE
C     FOR INTERPLANTED MANIOC
      ICCO = 5
      IDC = 3
      IF (ICRCAL(5) .EQ. 1) GO TO 106
C     FIRST CALL FOR MAIZE WITH MANIOC
```

```
61            DMZ(3) = BRAND(3.530D3, 5.119D3)
62            IF (DMZ(3) .LE. 0.) DMZ(3) = 0.
63            DRI(3) = 0.
63.3          DMN(3) = BRAND(2.647D3, 5.329D3)
63.6          IF(DMN(3) .LE. 0.0) DMN(3) = 0.0
64            IF (ICRCAL(4) .EQ. 1) DRI(3) = DRI(2)
65          106 CONTINUE
66            IF (LU .EQ. 9 .OR. LU .EQ. 11) GO TO 107
67            GO TO 103
68          107 CONTINUE
69            ICCO = 6
70            IDC = 4
71            IF (ICRCAL(6) .EQ. 1) GO TO 103
72        C   FIRST CALL FOR MAIZE WITH OTHER INTERPLANTED CROPS
73            DMZ(4) = BRAND(2.793D3, 5.624D3)
74            IF (DMZ(4) .LE. 0.) DMZ(4) = 0.
75            DRI(4) = 0.
76            IF (ICRCAL(4) .EQ. 1) DRI(4) = DRI(2)
77            DMN(4) = 0.
78            IF (ICRCAL(5) .EQ. 1) DMN(4) = DMN(3)
79          103 CONTINUE
80        C   MAXIMUM CROP CALL CODE
81            MAXCCC = 0
82            DO 108 IC = 3,6
83          108 MAXCCC = MAX0(MAXCCC, ICRCAL(IC))
84            IF (MAXCCC .GT. 0) GO TO 109
85        C   FIRST CALL FOR ANY CROP CODE FOR LOT AND YEAR
86        C   MULTIPLIERS FOR DISEASE, RATS, AND GERMINATION
87            DISMUL = 1.0
88            RATMUL = 1.0
89            GERMUL = 1.0
90        C   DISEASE DECISION
91            XRAN = ARAND(INIT, -1.)
92            IF (XRAN .LT. 0.018) DISMUL = 0.40
93        C   SEVERE RAT DAMAGE (INTENSITY 3 OR 4) DECISION
94            XRAN = ARAND(INIT, -1.)
95            IF (XRAN .LT. 0.388) RATMUL = BRAND(4.7D-1, 5.6D-1)
96            IF (RATMUL .LE. 0.) RATMUL = 0.
97        C   POOR GERMINATION DECISION
98            XRAN = ARAND(INIT, -1.)
99            IF (XRAN .LT. 0.071) GERMUL = 0.97
100       C   PH ADJUSTMENT FOR RESPONSE PLATEAU
101           PHADJ = 6.0
102           IF (PH(LOT, IPCH) .LE. PHADJ) PHADJ = PH(LOT, IPCH)
103           IF (DMZ(IDC) .LE. 0.0) DMZ(IDC) = 0.0
104       C   CALCULATION OF REGRESSION PREDICTED YIELD (KG / 1000 PLANTS)
105           PRYLME = 125. * PHADJ - 2.92E-2 * DMZ(IDC) - 2.22E-2 * DMN(IDC)
106          1 - 8.16E-4 * DRI(IDC) - 330.
107           PRYL = BRAND(1.51D2, PRYLME)
108       C   VARIABILITY DIFFERENCE
109           VBLTYD = PRYL - PRYLME
110         109 CONTINUE
111       C   CROP CALL CODE (0=NO PREVIOUS CALLS FOR LOT AND YEAR  1=PREV. CALLS)
112           ICRCAL(ICCO) = 1
113       C   PH ADJUSTMENT FOR RESPONSE PLATEAU
114           PHADJ = 6.0
115           IF (PH(LOT, IPCH) .LE. PHADJ) PHADJ = PH(LOT, IPCH)
116           IF (DMZ(IDC) .LE. 0.0) DMZ(IDC) = 0.0
117       C   CALCULATION OF REGRESSION PREDICTED YIELD (KG / 1000 PLANTS)
118           PRYLME = 125. * PHADJ - 2.92E-2 * DMZ(IDC) - 2.22E-2 * DMN(IDC)
```

```
     119           1 - 8.16E-4 * DRI(IDC) - 330.
     120            IF (PRYLME .LE. 0.) PRYLME = 0.
     121       C    MAIZE YIELD CALCULATION (KG / HA)
     122            PRYL = PRYLME * VBLTYD
     123            IF (PRYL .LE. 0.) PRYL = 0.
     124            YLDMZ = PRYL * 0.001 * DMZ(IDC) * DISMUL * RATMUL *
     125           1 GERMUL
     126       C    ADJUSTMENT FOR TECHNOLOGICAL IMPROVEMENT
     127            YLDMZ = YLDMZ * TECH(2)
     128            IF (YLDMZ .LE. 0.) YLDMZ = 0.
     129            RETURN
     130            END
END OF FILE
```

NDAYS

Purpose:	number of days: returns number of days since calendar day=1, month=1, and year=1.
Kind of routine:	function (integer)
Arguments:	IDA day
	ICALMO calendar month
	ICALYR calendar year
COMMON areas:	none
Routines called:	none
Routine called by:	IDAYYR
Program size:	576 bytes

NODIM

Purpose:	number of days in month: returns number of days
Kind of routine:	function (integer)
Arguments:	MO number of month
	MOTYPE month type (1=calendar, 2=agricultural)
COMMON areas:	DATE
Routines called:	none
Routine called by:	WEAGEN
Program size:	798 bytes

```
      1            FUNCTION NODIM(MO, MOTYPE)
      2      C     NUMBER OF DAYS IN MONTH FUNCTION. ARGUMENTS ARE MONTH AND MONTH
      3      C     TYPE (1=CALENDAR , 2=AGRICULTURAL)
      4            COMMON/DATE/ IYR
      5            IF (MOTYPE .EQ. 1)GO TO(100,101, 100, 102, 100, 102, 100, 100,
      6           1 102, 100, 102, 100), MO
      7            IF(MOTYPE .EQ. 2) GO TO (100, 100, 102, 100, 102, 100, 100, 101,
      8           1 100, 102, 100, 102), MO
      9            WRITE (6, 1000) MO, MOTYPE
     10       1000 FORMAT(1X, 'ERROR: MONTH', I5, 2X, 'OR TYPE', I5, 2X, 'NOT RECOGNI
     11           1ZED IN FUNCTION NODIM')
     12            CALL SYSTEM
     13        100 NODIM = 31
     14            GO TO 103
     15        101 NODIM = 28
     16            IF (MOD(IYR, 4) .EC. 0) NODIM = 29
     17            GO TO 103
     18        102 NODIM = 30
     19        103 CONTINUE
     20            RETURN
     21            END
END OF FILE
```

OUTPUT

Purpose:	produces plotted output of comparisons of carrying capacity measures with standards versus years.
Kind of routine:	subroutine
Arguments:	IYEARS number of years in simulation NORUN run number
COMMON areas:	STAND
Routines called:	none (however, uses the MTS system subroutines PLOT1, PLOT2, PLOT3, PLOT4, and ERROR)
Routine called by:	MAIN
Output units:	12 = file for plots of output 6 = *SINK* (terminal, for error messages)
Program size:	5870 bytes

```
      CALL PLOT1(NSCALE(1), 10, 3, 11, 9, 400)
      CALL PLOT2(0, FLOAT(MAXYR), 1971., YMAX(ISTD), 0., 400, 400, 400)
      CALL PLOT3(ICHAR, YR70(1), STDYR(1), IYEARS, 4, 400, 400,
     1 400)
      CALL PLOT4(26, 'PROPORTION OF AREA CLEARED',  400, 400, 400, 400,
     1 400, 400)
      GO TO 600
  208 WRITE (12, 1010)
 1010 FORMAT(     1X, 'AREA-WIDE AVERAGE CALORIES PER CAPITA (KCAL/PERSO
     1N/DAY)')
      CALL PLOT1(NSCALE(1), 10, 3, 11, 9, 400)
      CALL PLOT2(0, FLOAT(MAXYR), 1971., YMAX(ISTD), 0., 400, 400, 400)
      CALL PLOT3(ICHAR, YR70(1), STDYR(1), IYEARS, 4, 400, 400,
     1 400)
      CALL PLOT4(19, 'CALORIES PER CAPITA', 400, 400, 400,400, 400, 400,
     1 400)
      GO TO 600
  209 WRITE (12, 1011)
 1011 FORMAT(     1X, 'AREA-WIDE AVERAGE TOTAL PROTEIN PER CAPITA (G/PER
     1SON/DAY)')
      CALL PLOT1(NSCALE(1), 10, 3, 11, 9, 400)
      CALL PLOT2(0, FLOAT(MAXYR), 1971., YMAX(ISTD), 0., 400, 400, 400)
      CALL PLOT3(ICHAR, YR70(1), STDYR(1), IYEARS, 4, 400, 400,
     1 400)
      CALL PLOT4(24, 'TOTAL PROTEIN PER CAPITA', 400,
     1 400, 400, 400, 400, 400, 400)
      GO TO 600
  210 WRITE (12, 1012)
 1012 FORMAT(     1X, 'AREA-WIDE AVERAGE ANIMAL PROTEIN PER CAPITA (G/PE
     1RSON/DAY)')
      CALL PLOT1(NSCALE(1), 10, 3, 11, 9, 400)
      CALL PLOT2(0, FLOAT(MAXYR), 1971., YMAX(ISTD), 0., 400, 400)
      CALL PLOT3(ICHAR, YR70(1), STDYR(1), IYEARS, 4, 400, 400,
     1 400)
      CALL PLOT4(25, 'ANIMAL PROTEIN PER CAPITA', 400,
     1 400, 400, 400, 400, 400, 400)
      GO TO 600
  212 WRITE (12, 1017)
 1017 FORMAT(     1X, 'AREA-WIDE CASH STANDARD PER FAMILY',
     1 1X, '(MINIMUM WAGES PER FAMILY PER MONTH)')
      CALL PLOT1(NSCALE(1), 10, 3, 11, 9, 400)
      CALL PLOT2(0, FLOAT(MAXYR), 1971., YMAX(ISTD), 0., 400, 400, 400)
      CALL PLOT3(ICHAR, YR70(1), STDYR(1), IYEARS, 4, 400, 400,
     1 400)
      CALL PLOT4(24, 'MINIMUM WAGES PER FAMILY', 400,
     1 400, 400, 400, 400, 400, 400)
      GO TO 600
  211 WRITE (12, 1013)
 1013 FORMAT(     1X, 'AREA-WIDE AVERAGE PER CAPITA CASH STANDARD OF LIV
     1ING (CRUZ(1975)/PERSON/MO)')
      CALL PLOT1(NSCALE(1), 10, 3, 11, 9, 400)
      CALL PLOT2(0, FLOAT(MAXYR), 1971., YMAX(ISTD), 0., 400, 400, 400)
      CALL PLOT3(ICHAR, YR70(1), STDYR(1), IYEARS, 4, 400, 400,
     1 400)
      CALL PLOT4(20, 'CRUZEIROS PER CAPITA', 400,
     1 400, 400, 400, 400, 400, 400)
      GO TO 600
  213 WRITE (12, 1015)
 1015 FORMAT(     1X, 'POPULATION (PERSONS / SQ.KM.)')
      CALL PLOT1(NSCALE(1), 10, 3, 11, 9, 400)
```

```
  121            CALL PLOT2(0, FLOAT(MAXYR), 1971., YMAX(ISTD), 0., 400, 400, 400)
  122            CALL PLOT3(ICHAR, YR70(1), STDYR(1), IYEARS, 4, 400, 400,
  123           1 400)
  124            CALL PLOT4(21, 'PERSONS PER SQUARE KM.', 400,
  125           1 400, 400, 400, 400, 400, 400)
  126            GO TO 600
  127        214 WRITE (12, 1016)
  128       1016 FORMAT(      1X, 'PROPORTION OF ORIGINAL COLONISTS REMAINING')
  129            CALL PLOT1(NSCALE(1), 10, 3, 11, 9, 400)
  130            CALL PLOT2(0, FLOAT(MAXYR), 1971., YMAX(ISTD), 0., 400, 400, 400)
  131            CALL PLOT3(ICHAR, YR70(1), STDYR(1), IYEARS, 4, 400, 400,
  132           1 400)
  133            CALL PLOT4(29, 'PROPORTION ORIGINAL COLONISTS', 400,
  134           1 400, 400, 400, 400, 400, 400)
  135            GO TO 600
  136        500 CONTINUE
  137            CALL PLOT1(NSCALE(1), 10, 3, 11, 9, 400)
  138            CALL PLOT2(0, FLOAT(MAXYR), 1971., YMAX(ISTD), 0., 400, 400, 400)
  139            CALL PLOT3(ICHAR, YR70(1), STDYR(1), IYEARS, 4, 400, 400,
  140           1 400)
  141            CALL PLOT4(25, 'PROPORTION BELOW STANDARD', 400,
  142           1 400, 400, 400, 400, 400, 400)
  143        600 CONTINUE
  144            WRITE (12, 8003)
  145       8003 FORMAT(/53X, 'YEAR')
  146        101 CONTINUE
  147            GO TO 900
  148        400 WRITE (6, 1000)
  149       1000 FORMAT(1X, 'ERROR: IN ARGUMENT FOR PLOT IN SUBROUTINE OUTPUT')
  150            CALL ERROR
  151        900 CONTINUE
  152            RETURN
  153            END
END OF FILE
```

PASTSO

Purpose:	pasture soils changes
Kind of routine:	subroutine
Arguments:	LOT lot number
	IPCH patch number
COMMON areas:	SOIL, USECOM
Routines called:	BRAND
Routine called by:	SOILCH
Program size:	2524 bytes

```
      SUBROUTINE PASTSO(LOT, IPCH)
C     PASTURE SOILS SUBROUTINE
      DOUBLE PRECISION BRAND
      REAL*8 DLOG
      DOUBLE PRECISION PCHME,PH1,PH2,RNCHME,TIME1,TIME2, ALME , PHSTAR
      DOUBLE PRECISION PHOS, PH, AL, NITRO, CARB, CLAY, SLOPE, CCHME
      COMMON/SOIL/ PHOS(10,100), PH(10,100), AL(10,100),
     1 NITRO(10,100), CARB(10,100), CLAY(10,100), SLOPE(10,100)
      COMMON/USECOM/ LUSE(10,100), IDUR(10,100), LASTUS(10,100),
     1 CONTIN(10,100)
      COMMON/DATE/ IYR
      DIMENSION PHSTAR(10,100)
      EXTERNAL BRAND
C     BYPASS IF PASTURE OLDER THAN 1 YR. "EQUILIBRIUM"
      IF(IDUR(LOT,IPCH).GE. 367) GO TO 100
C     CARBON CHANGE MEAN
      CCHME = 0.85265 - 0.655 * CARB(LOT, IPCH)
      CARB(LOT, IPCH) = CARB(LOT, IPCH) + BRAND(3.8327D-1, CCHME)
C     PHOSPHORUS CHANGE MEAN
      PCHME = 1.2803 - 0.62233 * PHOS(LOT, IPCH)
      PHOS(LOT, IPCH) = PHOS(LOT, IPCH) + BRAND(1.2296D0, PCHME)
C     NITROGEN CHANGE MEAN
      RNCHME = 9.4229D-2 - 6.9176D-1  * NITRO(LOT, IPCH)
      NITRO(LOT, IPCH) = NITRO(LOT, IPCH) + BRAND(5.9159D-2, RNCHME)
  100 CONTINUE
C     PH CHANGE MEAN
      IF (IDUR(LOT, IPCH) .GE. 730) GO TO 101
C     PASTURE ONE YEAR OLD OR LESS CONSIDERED AS ONE YEAR CHANGE
      TIME2 = 1.
      PH1 = 0.
C     STARTING PH SAVED WHEN PASTURE FIRST PLANTED
      PHSTAR(LOT, IPCH) = PH(LOT, IPCH)
      IF (IYR .EQ. 2) GO TO 900
      GO TO 102
  101 CONTINUE
C     PASTURE OLDER THAN RANGE OF REGRESSION (21 YEARS) ASSUMED TO STAY
C     AT "EQUILIBRIUM" PH AND ALUMINUM VALUES.  NOTE THAT STANDARD RUN
C     RESTRICTIONS ON PASTURE LIFE DUE TO WEEDS WILL ALSO PREVENT THIS.
      IF (IDUR(LOT, IPCH) .GE. 7670) GO TO 900
      TIME1=FLOAT(IDUR(LOT, IPCH)) / 365.25
      TIME2 = TIME1 + 1.
C     NOTE THAT NO STOCHASTIC TERM IS INCLUDED IN PH CALCULATIONS
C     PH1 IS CUMULATIVE PH CHANGE FROM BEGINNING OF TIME IN PASTURE TO
C     BEGINNING OF COMPARISON INTERVAL
C     PH2 IS CUMULATIVE PH CHANGE FROM PASTURE PLANTING TO END OF
C     COMPARISON INTERVAL
      PH1 = 3.1392 - 5.4735D-1 * PHSTAR(LOT, IPCH) - 8.7496D-1 / TIME1
  102 PH2 = 3.1392 - 5.4735D-1 * PHSTAR(LOT, IPCH) - 8.7496D-1 / TIME2
      PH(LOT, IPCH) = PH(LOT, IPCH) + PH2 - PH1
C     ALUMINUM REGRESSION FROM VIRGIN INITIAL SOIL QUALITIES USED
      ALME = 11.429 - 7.6772 * DLOG(PH(LOT, IPCH)) - 6.2741D-2
     1 * CLAY(LOT, IPCH)
      AL(LOT, IPCH) = BRAND(1.56D0, ALME)
  900 CONTINUE
C     RESTRICTIONS ON REALISTIC LEVELS OF SOIL CHARACTERS
      IF (PH(LOT, IPCH) .LE. 3.) PH(LOT, IPCH) = 3.
      IF (PH(LOT, IPCH) .GE. 8.5) PH(LOT, IPCH) = 8.5
      IF(AL(LOT, IPCH) .LE. 0.) AL(LOT, IPCH) = 0.
      IF (PHOS(LOT, IPCH) .LE. 1.) PHOS(LOT, IPCH) = 1.
      IF (NITRO(LOT, IPCH) .LE. 0.01) NITRO(LOT, IPCH) = 0.01
```

```
    63            IF (CARB(LOT, IPCH) .LE. 0.01) CARB(LOT, IPCH) = 0.01
    64            RETURN
    65            END
END OF FILE
```

PAYBNK

Purpose:	bank loan payment: adjusts amounts of capital for payment
Kind of routine:	subroutine
Arguments:	LOT lot number BANKPD amount paid to bank (Cruzeiros of Jan. 1, 1975, a REAL number)
COMMON areas:	FIN
Routines called:	none
Routine called by:	PRALLO
Program size:	594 bytes

```
      1            SUBROUTINE PAYBNK(LOT, BANKPD)
      2      C     BANK PAYMENT SUBROUTINE: ADJUSTS DEBTS FOR PAYMENTS MADE
      3      C     ARGUEMENTS: LOT AND AMOUNT PAID BANK IN 1975 CRUZEIROS
      4            COMMON/FIN/ ISOLV(10), DUEPRI(20), DUEINT(20), AMTLO(10, 20),
      5           1 LOANDA(10, 20), LOANTY(10, 20), MAXNLO, RATNFL
      6            DO 100 LONO = 1, MAXNLO
      7            AMT = DUEINT(LONO)
      8            IF (BANKPD .LT. DUEINT(LONO)) AMT = BANKPD
      9            BANKPD = BANKPD - AMT
     10            IF (BANKPD .LT. 0.01) GO TO 102
     11            AMT = DUEPRI(LONO)
     12            IF (BANKPD .LT. DUEPRI(LONO)) AMT = BANKPD
     13            BANKPD = BANKPD - AMT
     14            AMTLO(LOT, LONO) = AMTLO(LOT, LONO) - AMT
     15            GO TO 100
     16          102 CONTINUE
     17      C     ADDITION OF UNPAID INTEREST TO LOAN PRINCIPAL
     18            AMTLO(LOT, LONO) = AMTLO(LOT, LONO) + DUEINT(LONO) - AMT
     19          100 CONTINUE
     20            RETURN
     21            END
END OF FILE
```

PAYLD

Purpose:	pasture yield: computes yield per hectare of pastu (cattle live weight gain).
Kind of routine:	subroutine
Arguments:	LOT lot number IPCH patch number
COMMON areas:	PASTUR, USECOM, YIELDS, SOIL, TECHN
Routines called:	none
Routine called by:	LOTPRO
Program size:	656 bytes

```
      1            SUBROUTINE PAYLD(LOT, IPCH)
      2      C     PASTURE YIELD SUBROUTINE: CALCULATES KG CATTLE LIVE WEIGHT GAIN
      3      C     PER HECTARE PER YEAR ON A GIVEN PATCH ASSUMING THAT THE PATCH IS
      4      C     STOCKED AT THE PASTURE FEEDING CAPACITY.
      5            DOUBLE PRECISION PHOS, PH, AL, NITRO, CARB, CLAY, SLOPE, DWTPH
      6            COMMON/USECOM/ LUSE(10,100), IDUR(10,100), LASTUS(10,100),
      7           1 CONTIN(10,100)
      8            COMMON/PASTUR/ BASEPY, YREFF(5), PACOEF, PACONS, PACHIP, WGPTDN,
      9           1 TDNPDM
     10            COMMON/TECHN/TECH(9), START(9)
     11            COMMON/SOIL/ PHOS(10,100), PH(10,100), AL(10,100),
     12           1 NITRO(10,100), CARB(10,100), CLAY(10,100), SLOPE(10,100)
     13            COMMON/YIELDS/ YLDRI, YLDMZ, YLDPS, YLDVI, YLDBN, YLDSN, YLDPE,
     14           1 YLDCA, YLDPA
     15      C     ASSIGNMENT OF YEAR EFFECT (EFFECT OF WEEDS)
     16            YEAREF = 0.
   16.2            IPYEAR = IDUR(LOT, IPCH) / 365
   16.4            IF (IPYEAR .LE. 1) IPYEAR = 1
     17            IF (IPYEAR .LE. 5) YEAREF = YREFF(IPYEAR)
     18      C     CALCULATION OF DRY WEIGHT PER HA PASTURE PRODUCED FROM BASE PASTURE
     19      C     YIELD, YEAR EFFECT, AND THE COEFFICIENT AND CONSTANT FROM THE
     20      C     PASTURE YIELD REGRESSION ON PHOSPHORUS
     21            DWTPH = BASEPY * (PACOEF * PHOS(LOT, IPCH) + PACONS) * YEAREF
     22      C     CALCULATION FOR HIGH (PLATEAU) PHOSPHORUS LEVELS
     23            IF (PHOS(LOT, IPCH) .GE. 10.) DWTPH = PACHIP * BASEPY * YEAREF
     24      C     CALCULATION OF CATTLE LIVE WEIGHT GAIN FROM PASTURE DRY WEIGHT
     25      C     YIELD (USEING WEIGHT GAIN PER KG TOTAL DIGESTIBLE NUTRIENTS AND
     26      C     KG TOTAL DIGESTIBLE NUTRIENTS PER KG DRY MATTER).
     27            YLDPA = DWTPH * WGPTDN* TDNPDM
     28      C     ADJUSTMENT FOR TECHNOLOGICAL IMPROVEMENT
     29            YLDPA = YLDPA * TECH(9)
     30            IF (YLDPA .LE. 0.) YLDPA = 0.
     31            RETURN
     32            END
END OF FILE
```

PEYLD

Purpose:	pepper yields
Kind of routine:	subroutine
Arguments:	LOT lot number
	IPCH patch number
COMMON areas:	SOIL, USECOM, DATE, TECHN, YIELDS, DISEA, FERT
Routines called:	BRAND
Routine called by:	LOTPRO
Program size:	1208 bytes

```
1            SUBROUTINE PEYLD(LOT, IPCH)
2       C    PEPPER YIELD SUBROUTINE
3            DOUBLE PRECISION BRAND
4            DOUBLE PRECISION PHOS, PH, AL, NITRO, CARB, CLAY, ELLIM,
5           1 PHADJ, CADJ, PADJ, SLOPE
6            COMMON/FERT/ ELLIM(2), DOSECA(4, 2, 3), DOSEPE(4, 2, 4),
7           1 PRICFE(5), PFERT(2), SLOLI, CONSLI, ALLIME,
8           2 SLOPHO, CONPHO, IFERT(10,100)
9            COMMON/SOIL/ PHOS(10,100), PH(10,100), AL(10,100),
10          1 NITRO(10,100), CARB(10,100), CLAY(10,100), SLOPE(10,100)
11           COMMON/USECOM/ LUSE(10,100), IDUR(10,100), LASTUS(10,100),
12          1 CONTIN(10,100)
13           COMMON/DATE/ IYR
14           COMMON/TECHN/ TECH(9), START(9)
15           COMMON/YIELDS/ YLDRI, YLDMZ, YLDPS, YLDVI, YLDBN, YLDSN, YLDPE,
16          1 YLDCA, YLDPA
17           COMMON/DISEA/ PINFEC(3, 2), LSPORE(3), IBPOD(10,100),
18          1 IWBROO(10,100), IFUSAR(10,100), IWBEST, IFUEST, IBPEST, BPMULT,
19          2 WBMULT, FUMULT, PRDIES(3)
20           EXTERNAL BRAND
21      C    FOLLOWING FOR DEATH OF PEPPER EXCEEDING
22      C    LIFE EXPECTANCY OF 12.5 YEARS (4566 DAYS)
23           IF (IDUR(LOT, IPCH) .LT. 4566) GO TO 101
24           YLDPE = 0.0
25           LUSE(LOT, IPCH) = 2
26           IDUR(LOT, IPCH) = 0
27           GO TO 900
28         101 CONTINUE
29      C    ADJUSTMENTS FOR RESPONSE PLATEAUS (PEPPER CRITICAL PH, P AND C)
30           PECRPH = 5.5
31           PECRP = 10.
32           PECRC = 2.0
33           PHADJ = PH(LOT, IPCH)
34           IF (PHADJ .GE. PECRPH) PHADJ = PECRPH
35           CADJ = CARB(LOT, IPCH)
36           IF (CADJ .GE. PECRC) CADJ = PECRC
37           IF (IFERT(LOT, IPCH) .EQ. 1) CADJ = PECRC
38           PADJ = PHOS(LOT, IPCH)
39           IF (PADJ .GE. PECRP) PADJ = PECRP
40      C    PEPPER YIELD FROM SOIL AS PROP. OF MAX. YIELD MEAN
41           YFSPMM = 0.292 * PHADJ + 0.382 * CADJ + 0.055 * PADJ - 2.119
42      C    PEPPER YIELD FROM SOIL AS PROP. OF MAX. YIELD
43           YFSPMY = SNGL(BRAND(1.87D-1, DBLE(YFSPMM)))
44      C    PEPPER YIELD FROM SOIL (KG/HA DRY SEEDS) ADJUSTED FOR ALTAMIRA
45           PEYFS = YFSPMY * START(8)
46      C    PEPPER YEAR EFFECT (FOR FIELDS OVER 4 YEARS OLD)
47           PEYREF = 1.
48           IF (IDUR(LOT, IPCH) .GE. 1461) GO TO 100
49           PEYREF = 0.80
50           IF (IDUR(LOT, IPCH) .LT. 1096) PEYREF = 0.40
51           IF (IDUR(LOT, IPCH) .LT. 730)  PEYREF = 0.
52         100 CONTINUE
53      C    FUSARIUM DISEASE EFFECT
54           FUSEFF = 1.
55           IF (IFUSAR(LOT, IPCH) .EQ. IYR) FUSEFF = FUMULT
56      C    CALCULATION OF PEPPER YIELD (KG / HA)
57           YLDPE = PEYFS.* FUSEFF
58      C    ADJUSTMENT FOR TECHNOLOGICAL IMPROVEMENT
59           YLDPE = YLDPE * TECH(8)
60           IF (YLDPE .LE. 0.) YLDPE = 0.
```

```
     61        900 CONTINUE
     62            RETURN
     63            END
END OF FILE
```

POPGEN

Purpose:	population generation both for original colonists (when called by MAIN) and newcomers (when called by LEAVE).
Arguments:	LOT lot number
	IFREEZ frozen population sector code: 1=frozen, 2=dynamic
COMMON areas:	POP, COLON, RANDOM
Routines called:	ARAND, BRAND
Routine called by:	LEAVE, MAIN, POPUL
Program size:	2376 bytes

```
      SUBROUTINE POPGEN(LOT, IFREEZ)
C     POPULATION GENERATION SUBROUTINE FOR BOTH INITIAL AND NEWCOMER
C     POPULATIONS
      DOUBLE PRECISION BRAND
      COMMON/POP/ MALE(1, 86), IFEM(1, 86), FAMSTR(10, 2), PDEP(86,2),
     1 FLEQUI(2, 5), PDEATH(2, 86), PINDEM(2, 86),
     2 PINDIM, PBIRTH(44), CALAGE(8), PROAGE(19), MARIT(1),
     3 PMARRY, AGBRME, AGBRSD, PMIMIG, PRIMAG(2, 86),
     4 CALREQ(25), PROREC(8)
      COMMON/COLON/ LUPAT(1), CAPIT(1), CGOODS(1), AREACL(1),
     1 FAMLAB(1), MALES(1), FAMSIZ(1), CGDENT(1), CAPCON(1),
     2 MORTYP(1), IORIG(1), CGOCON(1), CAPENT(1)
      COMMON/RANDOM/ INIT
      EXTERNAL ARAND, BRAND
      FAMSIZ(LOT) = 1.
      DO 100 IAGE = 1, 86
      MALE(LOT, IAGE) = 0
  100 IFEM(LOT, IAGE) = 0
C     CALCULATION OF OWNER'S AGE
      OWNER = SNGL(BRAND(DBLE(FAMSTR(2, IORIG(LOT))),
     1 DBLE(FAMSTR(1, IORIG(LOT)))))
      IF (OWNER .LT. 15.)OWNER = 15.
      IF (IFREEZ .EQ. 1) OWNER = FAMSTR(1, IORIG(LOT))
C     NOTE: AGE CLASSES ARE ACTUALLY AGE IN YEARS + 1
      OWNER = OWNER + 1.
      MALE(LOT, INT(OWNER)) = MALE(LOT, INT(OWNER)) + 1
C     DETERMINATION OF PRESENCE OF WIFE
      MARIT(LOT) = 1
      XRAN = ARAND(INIT, -1.)
      IF (IFREEZ .EQ. 1) XRAN = 0.5
      IF (XRAN .GE. FAMSTR(5, IORIG(LOT))) GO TO 101
C     CALCULATION OF WIFE'S AGE
      WIFAGE = SNGL(BRAND(DBLE(FAMSTR(7, IORIG(LOT))),
     1 DBLE(FAMSTR(6, IORIG(LOT)))))
      IF (WIFAGE .LT. 14.) WIFAGE = 14.
C     NOTE: AGE CLASSES ARE ACTUALLY AGE IN YEARS + 1
      WIFAGE = WIFAGE + 1.
      IFEM(LOT, INT(WIFAGE)) = IFEM(LOT, INT(WIFAGE)) + 1
      FAMSIZ(LOT) = FAMSIZ(LOT) + 1.
      MARIT(LOT) = 2
  101 CONTINUE
C     DETERMINATION OF PRESENCE OF OTHER DEPENDENTS (OTHER THAN WIFE)
      XRAN = ARAND(INIT, -1.)
      IF (IFREEZ .EQ. 1) XRAN = 0.5
      IF (MARIT(LOT) .EQ. 2 .AND. XRAN .GE. FAMSTR(3, IORIG(LOT)))
     1 GO TO 103
      IF (MARIT(LOT) .EQ. 1 .AND. XRAN .GE. FAMSTR(4, IORIG(LOT)))
     1 GO TO 103
C     CALCULATION OF NUMBER OF OTHER DEPENDENTS
      NODEPS = IDINT(BRAND(DBLE(FAMSTR(10, IORIG(LOT))),
     1 DBLE(FAMSTR(9, IORIG(LOT)))))
      IF (NODEPS .LE. 0) NODEPS = 1
      IF (IFREEZ .EQ. 1) NODEPS = INT(FAMSTR(9, IORIG(LOT)))
      DO 200 I = 1, NODEPS
      FAMSIZ(LOT) = FAMSIZ(LOT) + 1.
      XRAN = ARAND(INIT, -1.)
      IF (IFREEZ .EQ. 1) XRAN = 0.5
      PCUM = 0.
      DO 201 IAGDEP = 1, 86
C     DETERMINE AGE OF DEPENDENT
```

```
      61            PCUM = PCUM + PDEP(IAGDEP, IORIG(LOT))
      62            IF (XRAN .LT. PCUM) GO TO 202
      63            GO TO 201
      64          202 XRAN = ARAND(INIT, -1.)
      65            IF (IFREEZ .EQ. 1) XRAN = 0.5
      66       C    DETERMINE SEX OF DEPENDENT
      67            ISEX = 2
      68            IF (XRAN .LT. FAMSTR(8, IORIG(LOT))) ISEX = 1
      69            IF (ISEX .EQ. 2) IFEM(LOT, IAGDEP) = IFEM(LOT, IAGDEP) + 1
      70            IF (ISEX .EQ. 1) MALE(LOT, IAGDEP) = MALE(LOT, IAGDEP) + 1
      71            GO TO 200
      72          201 CONTINUE
      73          200 CONTINUE
      74          103 CONTINUE
      75            RETURN
      76            END
END OF FILE
```

POPUL

Purpose:	population processes: ageing, births, deaths, colonist marriage, individual emmigration, and individual immigration (note: does not include family unit emmigration (subroutine LEAVE) or immigration (subroutine POPGEN)).
Kind of routine:	subroutine
Arguments:	LOT lot number IFREEZ frozen population sector code: 1=frozen, 2=dynamic
COMMON areas:	POP, FOOD, RANDOM, KMEAS, COLON, NUTRI
Routines called:	ARAND, BRAND, POPGEN
Routine called by:	MAIN
Program size:	3782 bytes

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```
0001           SUBROUTINE POPUL(LOT, IFREEZ)
         C     POPULATION SUBROUTINE: AGEING, BIRTHS, DEATHS, COLONIST MARRIAGE
         C     AND INDIVIDUAL IMMIGRATION AND EMMIGRATION
0002           DOUBLE PRECISION BRAND
0003           COMMON/POP/ MALE(10, 86), IFEM(10, 86), FAMSTR(10, 2), PDEP(86,2),
              1 FLEOUT(2, 5), PDEATH(2, 86), PINDEM(2, 86),
              2 PINDIM, PBIRTH(44), CALAGE(8), PROAGE(19), MARIT(10),
              3 PMARRY, AGRPME, AGRPSD, PRIMIG, PRIMAG(2, 86),
              4 CALPRO(25), PROPEC(9)
0004           COMMON/FOOD/ EAT(17), SURNCH, EATGAM(10)
0005           COMMON/RANDOM/ INIT
0006           COMMON/MEAS/ CALCPC, PROTPC, ANPRPC
0007           COMMON/COLON/ LUPAT(10), CAPIT(10), CGOODS(10), AREACL(10),
              1 FAMLAB(10), MALES(10), FAMSIZ(10), CGOENT(10), CAPCON(10),
              2 MORTYP(10), ICRIG(10), CGCCON(10), CAPENT(10)
0008           COMMON/NUTRI/ CALOR(17), TOTPRO(17), ANIPRO(17)
0009           EXTERNAL ARAND, BRAND
         C     DETERMINE CALORIES (KCAL/YEAR), AND TOTAL PROTEIN (KG/YEAR), AND
         C     ANIMAL PROTEIN (KG/YEAR) FOR FAMILY
0010           CALOF = 0.
0011           PROTF = 0.
0012           ANIMPR = 0.
0013           DO 200 ITEM = 1, 17
0014           CALOF = CALOF + CALOR(ITEM) * EAT(ITEM)
0015           PROTF = PROTF + TOTPRO(ITEM) * EAT(ITEM)
0016       200 ANIMPR = ANIMPR + ANIPRO(ITEM) * EAT(ITEM)
         C     PER CAPITA CALORIES (KCAL/DAY), TOTAL PROTEIN (GRAMS/DAY),
         C     AND ANIMAL PROTEIN (GRAMS/DAY)
0017           PERSON = FAMSIZ(LOT)
0018           IF (FAMSIZ(LOT) .LT. 0.1) PERSON = 1.
0019           CALOPC = CALOF / PERSON / 365.25
0020           PROTPC = PROTF / PERSON / 365.25 * 1000.
0021           ANPRPC = ANIMPR/ PERSON / 365.25 * 1000.
         C     BYPASS IF POPULATION FROZEN
0022           IF (IFREEZ .EQ. 1) GO TO 900
         C     INITIALIZATION OF BABY COUNTERS
0023           MBABY = 0
0024           IFBABY = 0
0025           DO 100 ISEX = 1, 2
         C     AGES EXAMINED IN DECENDING ORDER TO PREVENT
         C     COMPLICATIONS FROM AGEING TRANSITIONS
0026           IAGE = 87
         C     BEGINNING OF EXPLICIT DO LOOP
0027       800 CONTINUE
0028           IAGE = IAGE - 1
0029           IF (IAGE .LE. 0) GO TO 101
0030           INDIVS = MALE(LOT, IAGE)
0031           IF (ISEX .EQ. 2) INDIVS = IFEM(LOT, IAGE)
0032           IF (INDIVS .EQ. 0) GO TO 800
         C     ASSIGNMENT OF CALORIE FACTOR AGE CLASS
0033           ICFAGE = 8
0034           IF (IAGE .LE. 20) ICFAGE = 7
0035           IF (IAGE .LE. 16) ICFAGE = 6
0036           IF (IAGE .LE. 13) ICFAGE = 5
0037           IF (IAGE .LE. 10) ICFAGE = 4
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0038              IF (IAGE .LE.  7) ICRAGE = 3                                  56.000
0039              IF (IAGE .LE.  4) ICRAGE = 2                                  57.000
0040              IF (IAGE .LE.  1) ICRAGE = 1                                  58.000
                C     ASSIGNMENT OF CALORIE REQUIREMENT AGE CLASS               59.000
0041              IF (IAGE .LE. 20) ICRAGE = IAGE                               60.000
0042              IF (IAGE .GE. 21) ICRAGE = 21                                 61.000
0043              IF (IAGE .GE. 41) ICRAGE = 22                                 62.000
0044              IF (IAGE .GE. 51) ICRAGE = 23                                 63.000
0045              IF (IAGE .GE. 61) ICRAGE = 24                                 64.000
0046              IF (IAGE .GE. 71) ICRAGE = 25                                 65.000
                C     ASSIGNMENT OF PROTEIN FACTOR AGE CLASS (EXCESS MORTALITY FACTOR)  66.000
0047              IPRAGE = 1                                                    67.000
0048              IF (IAGE .LE. 18) IPRAGE = IAGE                               68.000
                C     ASSIGNMENT OF PROTEIN REQUIREMENT AGE CLASS               69.000
0049              IPRAGE = 8                                                    70.000
0050              IF (IAGE .LE. 20) IPRAGE = 7                                  71.000
0051              IF (IAGE .LE. 18) IPRAGE = 6                                  72.000
0052              IF (IAGE .LE. 13) IPRAGE = 5                                  73.000
0053              IF (IAGE .LE. 10) IPRAGE = 4                                  74.000
0054              IF (IAGE .LE.  7) IPRAGE = 3                                  75.000
0055              IF (IAGE .LE.  4) IPRAGE = 2                                  76.000
0056              IF (IAGE .LE.  1) IPRAGE = 1                                  77.000
0057              DO 102 IND = 1, INDIVS                                        78.000
                C     CALCULATION OF PROBABILITY OF DEATH FROM CALORIE DEFICIENCY  79.000
0058              CALRAT = CALDPC / CALREQ(ICRAGE)                              80.000
0059              IF (CALRAT .GE. 1.) CALRAT = 1.                               81.000
0060              CALMOR = (CALAGE(ICRAGE) - 1.) * (1. - CALRAT)                82.000
0061              IF (CALMOR .GE. 1.) CALMOR = 1.                               83.000
                C     CALCULATION OF PROBABILITY OF DEATH DUE TO PROTEIN DEFICIENCY  84.000
0062              PROTNE = SNGL(BRAND((DBLE(PROREQ(IPRAGE)) * 1.50-1),          85.000
                -  1.DBLE(PROREQ(IPRAGE))))                                     86.000
0063              IF (PROTNE .LE. 0.) PROTNE = 0.1                              87.000
0064              PRORAT = PROTPC / PROTNE                                      88.000
0065              IF (PRORAT .GE. 1.) PRORAT = 1.                               89.000
0066              PROMOR = (PROAGE(IPRAGE) - 1.) * (1. - PRORAT)                90.000
0067              IF (PROMOR .GE. 1.) PROMOR = 1.                               91.000
                C     PROBABILITY OF NUTRIENT DEFICIENCY DEATH TAKEN AS MAXIMUM OF  92.000
                C     CALORIE AND PROTEIN PROBABILITIES                         93.000
0068              PNUTDE = AMAX1(CALMOR, PROMOR)                                94.000
                C     DETERMINATION OF DEATH FROM ALL CAUSES                    95.000
0069              PDIES = 1. - (1. - PDEATH(ISEX, IAGE)) * (1. - PNUTDE)        96.000
0070              XRAN = ARAND(INIT, -1.)                                       97.000
0071              IF (XRAN .LT. PDIES) GO TO 400                                98.000
                C     DETERMINATION OF EMMIGRATION OF INDIVIDUALS               99.000
0072              XRAN = ARAND(INIT, -1.)                                       100.000
0073              IF (XRAN .LT. EMIGRM(ISEX, IAGE)) GO TO (103, 104), ISEX      101.000
0074              IF (IAGE .EQ. 86) GO TO 102                                   102.000
0075              NEXTAG = IAGE + 1                                             103.000
0076              IF (ISEX .EQ. 2) GO TO 106                                    104.000
0077              MALE(LOT, NEXTAG) = MALE(LOT, NEXTAG) + 1                     105.000
0078          103 MALE(LOT, IAGE) = MALE(LOT, IAGE) - 1                         106.000
0079              GO TO 102                                                     107.000
0080          400 FAMSIZ(LOT) = FAMSIZ(LOT) - 1.                                108.000
0081              GO TO (103, 104), ISEX                                        109.000
0082          106 IFEM(LOT, NEXTAG) = IFEM(LOT, NEXTAG) + 1                     110.000
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                C     DETERMINATION OF BIRTHS                                          111.000
0093                  IF (IAGE .LT. 25 .OR. IAGE .GT. 44) GO TO 104                    112.000
0094                  XRAN = BRAND(INIT, -1.)                                          113.000
0095                  IF (XRAN .GE. BIRTH(IAGE)) GO TO 104                             114.000
0096                  FAMSIZ(LOT) = FAMSIZ(LOT) + 1.                                   115.000
                C     DETERMINE SEX OF BABY                                            116.000
0097                  XRAN = BRAND(INIT, -1.)                                          117.000
0098                  IF (XRAN .LT. 0.5) MBABY = MBABY + 1                             118.000
0099                  IF (XRAN .GE. 0.5) IFBABY = IFBABY + 1                           119.000
0090                104 IFEM(LOT, IAGE) = IFEM(LOT, IAGE) - 1                        120.000
0091                102 CONTINUE                                                     121.000
                C     END OF EXPLICIT DO LOOP                                          122.000
0092                  GO TO 800                                                        123.000
0093                101 CONTINUE                                                     124.000
0094                100 CONTINUE                                                     125.000
                C     ADDITION OF BABIES                                               126.000
0095                  MALE(LOT, 1) = MBABY                                             127.000
0096                  IFEM(LOT, 1) = IFBABY                                            128.000
                C     DETERMINATION OF MARRIAGE FOR SINGLE COLONISTS (OWNERS OF LOTS)  129.000
0097                  IF (MARIT(LOT) .EQ. 2) GO TO 300                                 130.000
0098                  XRAN = BRAND(INIT, -1.)                                          131.000
0099                  IF (XRAN .GE. PMARRY) GO TO 300                                  132.000
                C     DETERMINE AGE OF BRIDE                                           133.000
0100                  AGEBRI = SNGL(BRANC(DBLE(AGBRSD), DBLE(AGBRME)))                 134.000
0101                  IAGBR = INT(AGEBRI)                                              135.000
0102                  IF (IAGBR .LT. 14) IAGBR = 14                                    136.000
                C     NOTE: AGE CLASSES ACTUALLY AGE IN YEARS + 1                      137.000
0103                  IAGBR = IAGBR + 1                                                138.000
0104                  IF (IAGBR .GE. 86) IAGBR = 86                                    139.000
0105                  IFEM(LOT, IAGBR) = IFEM(LOT, IAGBR) + 1                          140.000
0106                  MARIT(LOT) = 2                                                   141.000
0107                  FAMSIZ(LOT) = FAMSIZ(LOT) + 1.                                   142.000
0108                300 CONTINUE                                                     143.000
                C     DETERMINATION OF IMMIGRATION OF INDIVIDUALS (OTHER THAN COLONIST 144.000
                C     SPOUSES)                                                         145.000
0109                  XRAN = BRAND(INIT, -1.)                                          146.000
0110                  IF (XRAN .GE. PIMIM) GO TO 900                                   147.000
0111                  FAMSIZ(LOT) = FAMSIZ(LOT) + 1.                                   148.000
                C     DETERMINATION OF SEX OF IMMIGRANT INDIVIDUAL                     149.000
0112                  IMMSEX = 2                                                       150.000
0113                  XRAN = BRAND(INIT, -1.)                                          151.000
0114                  IF (XRAN .LE. PMIMIG) IMMSEX = 1                                 152.000
                C     DETERMINATION OF AGE OF IMMIGRANT                                153.000
0115                  XRAN = BRAND(INIT, -1.)                                          154.000
0116                  PCUM = 0.                                                        155.000
0117                  DO 301 IAGIM = 1, 84                                             156.000
0118                  PCUM = PCUM + PRIMAG(IMMSEX, IAGIM)                              157.000
0119                  IF (XRAN .LE. PCUM) GO TO (302, 303), IMMSEX                     158.000
0120                  GO TO 301                                                        159.000
0121                302 MALE(LOT, IAGIM) = MALE(LOT, IAGIM) + 1                      160.000
0122                  GO TO 304                                                        161.000
0123                303 IFEM(LOT, IAGIM) = IFEM(LOT, IAGIM) + 1                      162.000
0124                  GO TO 304                                                        163.000
0125                301 CONTINUE                                                     164.000
0126                304 CONTINUE                                                     165.000
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  0127          900 CONTINUE                                                          166.000
                C     NEW COLCNTST FAMILY INSTALLED IF FAMILY SIZE                    167.000
                C     DROPS TO ZERO                                                   168.000
  0128                IF (FAMSIZ(LCT) .GT. 0.01) GO TO 901                            169.000
  0129                IORIG(LCT) = 2                                                  170.000
  0130                CALL PORGEN(LCT, 2, IFREEZ)                                     171.000
  0131          901 CONTINUE                                                          172.000
  0132                RETURN                                                          173.000
  0133                END                                                             174.000
   *OPTIONS IN EFFECT*   ID,EBCDIC,SOURCE,NOLIST,NODECK,LOAD,NOMAP
   *OPTIONS IN EFFECT*   NAME = POPUL    , LINECNT =      57
   *STATISTICS*     SOURCE STATEMENTS =      133,PROGRAM SIZE =     3782
   *STATISTICS*  NO DIAGNOSTICS GENERATED

NO STATEMENTS FLAGGED IN THE ABOVE COMPILATIONS.
```

PRALLO

Purpose:	product allocation
Kind of routine:	subroutine
Arguments:	LOT lot number
COMMON areas:	NEED, RANDOM, FOOD, COLON, DATE, SPOIL, COSTS, FIN, AREAS, PROD, PRIC, GAME, PRALCO, SEEDNE, TUBERS
Routines called:	ITPORT, BANK, PAYBNK, CASHAL, MEASUR, BUFFER, ARAND, BRAND
Routine called by:	MAIN
Program size:	6568 bytes

```
      SUBROUTINE PRALLO(LOT)
C     PRODUCT ALLOCATION SUBROUTINE
      DOUBLE PRECISION BRAND
      DIMENSION   SESTOR(4)
      COMMON/NEED/ SUKGRI, SUKGMZ,  SUKGDE, SUKGMN, SUCASH, ZCRISK,
     1 SUKGMT
      COMMON/RANDOM/ INIT
      COMMON/FOOD/ EAT(17), SUBNCE, EATGAM(10)
      COMMON/GAME/ SMEAT, IHUNT(10), PHUNT, IENDHU, EFFORT(12), YLDSLO,
     1 YLDINT, EFFSLO, EFFINT, GWASTE
      COMMON/COLON/ LUPAT(10), CAPIT(10), CGOODS(10), AREACL(10),
     1 FAMLAB(10), MALES(10), FAMSIZ(10), CGOENT(10), CAPCON(10),
     2 MORTYP(10), IOBIG(10), CGOCON(10), CAPENT(10)
      COMMON/DATE/ IYR
      COMMON/PRALCO/PSELLB(10), PRVOLP, PPLPAY, TRANME, TRANSD,
     1 BTRCME, BTRCSD, CHICMZ, CWASTE
      COMMON/PRIC/ YRSUPR(17), YRSEPR(17)
      COMMON/SPOIL/ ESPOIL(10), SPOIME(10), SPOISD(10), SPOSME(10),
     1 SPOSSD(10)
      COMMON/OUTSID/ PCRECD, CRECME, CRECSD, PCSENT, CSENME, CSENSD
      COMMON/COSTS/ COLAB(12), BUYME(17), BUYSD(17), SELLME(17),
     1 SELLSD(17)
      COMMON/FIN/ ISOLV(10), DUEPRI(20), DUEINT(20), AMTLO(10, 20),
     1 LOANDA(10, 20), LOANTY(10, 20), MAXNLO, RAINFL
      COMMON/AREAS/ AREA(10)
C     NOTE THAT AREA IS DIMENSIONED FOR CROPS
      COMMON/PROD/ PRES(17), SEEDST(10, 4), SEED(4)
      COMMON/SEEDNE/ SEEDN, SEEDCN, ISCALL
      COMMON/TUBERS/ TUBCAL, TUBTP
      EXTERNAL BANK, ITPORT, BUFFER, ARAND, BRAND
      CASH = CAPCON(LOT) + CAPIT(LOT) + CAPENT(LOT)
      CAPCON(LOT) = 0.
      CAPIT(LOT) = 0.
      CAPENT(LOT) = 0.
      IF (CASH .LE. 0.) CASH = 0.
C     ADDITION OF CASH RECEIVED FROM OUTSIDE OF AREA
      CHRECD = 0.
      IF (ARAND(INIT, -1.) .LT. PCRECD) CHRECD =
     1 AMAX1(SNGL(BRAND(DBLE(CRECSD), DBLE(CRECME))), 0.)
      CASH = CASH + CHRECD
      BANKPD = 0.
      ITRIP = 1
C     DETERMINATION OF PRESENCE OF ADEQUATE TRANSPORT FOR MARKETING CROP
C     (1=AVAILABLE  2=NOT AVAILABLE)
      ITPAV = ITPORT(LOT)
C     DETERMINE COST OF TRANSPORT TO CITRAZEM (PER KG)
      TRANCO = SNGL(BRAND(DBLE(TRANSD), DBLE(TRANME)))
      IF (TRANCO .LE. 0.) TRANCO = 0.
C     DETERMINE BANK TRIP COSTS IF PRODUCT SOLD TO BANK
      BNKTRC = SNGL(BRAND(DBLE(BTRCSD), DBLE(BTRCME)))
      IF (BNKTRC .LE. 0.) BNKTRC = 0.
C     INITIALIZATION OF AMOUNT EATEN
      DO 500 IPROD = 1, 17
  500 EAT(IPROD) = 0.
C     DETERMINATION OF AMOUNT DUE BANK AND INCRA
      DUE = BANK(LOT)
C     CALCULATION OF SUBSISTENCE NEED FOR PRODUCTS (INCLUDING ALLOWANCE
C     FOR EXPECTED SPOILAGE)
      SUBNRI = SUKGRI * FAMSIZ(LOT) * (1. + ESPOIL(1))
      SUBNMZ = SUKGMZ * FAMSIZ(LOT) * (1. + ESPOIL(2))
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      SUBNBE = SUKGBE * FAMSIZ(LOT) * (1. + ESPOIL(4))
      SUBNMN = SUKGMN * FAMSIZ(LOT) * (1. + ESPOIL(6))
      SUBNCH = SUCASH * FAMSIZ(LOT)
      IF (EAT(1) .GE. (SUBNRI - 0.1)) GO TO 111
      IF (SUBNRI .GT. PRES(1)) GO TO 103
C     RICE EATEN
      PRES(1) = PRES(1) - SUBNRI
      EAT(1) = SUBNRI
  111 IF (EAT(2) .GE. (SUBNMZ - 0.1)) GO TO 112
      IF (SUBNMZ .GT. PRES(2)) GO TO 104
C     MAIZE EATEN
      PRES(2) = PRES(2) - SUBNMZ
      EAT(2) = SUBNMZ
  112 IF ((EAT(3) + EAT(4)) .GE. (SUBNBE - 0.1)) GO TO 108
      IF (SUBNBE .GT. (PRES(3)+PRES(4))) GO TO 105
      IF (PRES(4) .GT. SUBNBE) GO TO 130
      EAT(4) = PRES(4)
      EAT(3) = SUBNBE - PRES(4)
      GO TO 531
  130 EAT(4) = SUBNBE
      EAT(3) = 0.
C     VIGNA EATEN BEFORE PHASEOLUS
  531 PRES(4) = PRES(4) - SUBNBE
      IF (PRES(4) .LT. 0.) GO TO 107
      GO TO 108
  107 PRES(3) = PRES(3) + PRES(4)
      PRES(4) = 0.
  108 IF ((EAT(5) + EAT(6)) .GE. (SUBNMN - 0.1)) GO TO 110
      IF (SUBNMN .GT. (PRES(5) + PRES(6))) GO TO 106
C     SWEET MANIOC EATEN BEFORE BITTER
      PRES(6) = PRES(6) - SUBNMN
      IF (PRES(6) .LT. 0.) GO TO 109
      EAT(6) = SUBNMN
      EAT(5) = 0.
      GO TO 110
  109 PRES(5) = PRES(5) + PRES(6)
      EAT(6) = SUBNMN + PRES(6)
      EAT(5) = SUBNMN - EAT(6)
      PRES(6) = 0.
      GO TO 110
  103 CONTINUE
C     CASE OF INSUFFICIENT RICE FOR SUBSISTENCE NEED
      SUBNCH = SUBNCH + (SUBNRI - PRES(1)) * (BUYME(1) + ZCRISK *
     1 BUYSD(1))
      EAT(1) = PRES(1)
      PRES(1) = 0.
      GO TO 111
  104 CONTINUE
C     CASE OF INSUFFICIENT MAIZE FOR SUBSISTENCE NEED
C     SUBSISTENCE CASH NEED ADJUSTMENT FOR MEAT REQUIREMENTS
C     EXPECTED MEAT
      EXPMEA = PRES(2) * CHICMZ * CWASTE + EATGAM(LOT)
C     EXPECTED MEAT DEFICIT
      EXMEDE = SUKGMT * FAMSIZ(LOT) - EXPMEA
      IF (EXMEDE .LE. 0.) GO TO 300
C     PLANS ON BUYING MEAT IF AVAILABLE
      IF (SMEAT .LE. 0.) GO TO 301
      IF (SMEAT .LE. EXMEDE) GO TO 302
C     CASE OF ADEQUATE GAME AVAILABLE
      SUBNCH = SUBNCH + EXMEDE * YRBUPR(14)
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121           GO TO 300
122         302 CONTINUE
123       C     CASE OF INADEQUATE GAME AVAILABLE
124           SUBNCH = SUBNCH + SMEAT * YRBUPR(14)
125           EXMEDE = EXMEDE - SMEAT
126         301 CONTINUE
127       C     EXPECTED PURCHASE OF CANNED MEAT
128           SUBNCH = SUBNCH + EXMEDE * YRBUPR(17)
129         300 CONTINUE
130           EAT(2) = PRES(2)
131           PRES(2) = 0.
132           GO TO 112
133         105 CONTINUE
134       C     CASE OF INSUFFICIENT BEANS FOR SUBSISTENCE NEED
135       C     VIGNA PURCHASED FOR SUBSISTENCE BEAN NEEDS NOT MET FROM LOT
136           SUBNCH = SUBNCH + (SUBNBE - PRES(3) - PRES(4)) * (BUYME(4) +
137          1 ZCRISK * BUYSD(4))
138           EAT(3) = PRES(3)
139           EAT(4) = PRES(4)
140           PRES(3) = 0.
141           PRES(4) = 0.
142           GO TO 108
143         106 CONTINUE
144       C     CASE OF INSUFFICIENT MANIOC FOR SUBSISTENCE NEEDS
145       C     SWEET MANIOC PURCHASED FOR DEFICIT
146           SUBNCH = SUBNCH + (SUBNMN - PRES(5) - PRES(6)) * (BUYME(6)
147          1 + ZCRISK * BUYSD(6))
148           EAT(5) = PRES(5)
149           EAT(6) = PRES(6)
150           PRES(5) = 0.
151           PRES(6) = 0.
152         110 CONTINUE
153           DO 102 ICROP = 1,10
154       C     ANTICIPATED NEED FOR SEED STORAGE (SESTOR) FOR RICE, MAIZE,
155       C     PHASEOLUS AND VIGNA
156           IF (ICROP .GE. 5) GO TO 116
157           SESTOR(ICROP) = SEED(ICROP) * AREA(ICROP) * (1. + ESPOIL(ICROP))
158         117 CONTINUE
159       C     FOR SEED STORAGE
160           IF (PRES(ICROP) .LT. SESTOR(ICROP)) GO TO 121
161           PRES(ICROP) = PRES(ICROP) - SESTOR(ICROP)
162       C     SEED ACTUALLY STORED SET EQUAL TO SEED STORAGE NEED
163           SEEDST(LOT, ICROP) = SESTOR(ICROP)
164           GO TO 116
165         121 SEEDCC =(SESTOR(ICROP) - PRES(ICROP)) * (BUYME(ICROP) + ZCRISK
166          1 * BUYSD(ICROP))
167           SEEDCN = SEEDCN + SEEDCC
168       C     "SEEDCC" IS SEEDS FOR CROP CASH
169       C     "SEEDCN" IS SEED CASH NEED ; "SUBNCH" IS SUBSISTENCE NEED FOR CASH
170           SUBNCH = SUBNCH + SEEDCC
171           SEEDST(LOT, ICROP) = PRES(ICROP)
172           PRES(ICROP) = 0.
173         116 CONTINUE
174       C     PRODUCTS SKIPPED IF NONE PRESENT
175           IF (PRES(ICROP) .LE. 0.) GO TO 102
176       C     BYPASS IF TRANSPORT NOT AVAILABLE
177           IF (ITPAV .EQ. 2) GO TO 102
178       C     DETERMINATION IF CROP SOLD TO BANK OF BRASIL
179           XRAN = ARAND(INIT, -1.)
180           IF (XRAN .LT. PSELLB(ICROP)) GO TO 125
```

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      C     SOLD PRIVATELY
            CASH = CASH + PRES(ICROP) * YRSEPR(ICROP)
            PRES(ICROP) = 0.
            GO TO 102
          125 CONTINUE
      C     SOLD TO BANK
      C     TRIPS TO BANK DEDUCTED FROM CASH (FOR FIRST TIME FOR COL. AND YR)
            IF (ITRIP .EQ. 1) CASH = CASH - BNKTRC
            ITRIP = 2
      C     DEBTS DUE DEDUCTED FROM BALANCE RECEIVED BY COLONIST
            BALAN = PRES(ICROP) * YRSEPR(ICROP) - DUE
            IF ((BALAN+CASH) .LT. (TRANCO*PRES(ICROP)))GO TO 190
            IF (BALAN .GE. 0.) GO TO 127
      C     CASE OF CROP VALUE INADEQUATE TO PAY BOTH DEBT
      C     AND TRANSPORT COSTS
          190 DUE = DUE - PRES(ICROP) * YRSEPR(ICROP)
            BANKPD = BANKPD + PRES(ICROP) * YRSEPR(ICROP)
      C     TRANSPORT COSTS DEDUCTED FROM CASH
            IF (CASH .LE. 0.) CASH = 0.
            CASH = CASH - PRES(ICROP) * TRANCO
      C     COLONISTS WITH INSUFFICIENT CASH TO PAY TRANSPORT COSTS
      C     ASSUMED TO BE ABLE TO PAY IN KIND
            IF (CASH .LT. 0.) BANKPD = BANKPD + CASH
            IF (CASH .LE. 0.) CASH=0.
            PRES(ICROP) = 0.
            GO TO 102
          127 CONTINUE
      C     CASE OF CROP VALUE ADEQUATE TO PAY DEBT
            BANKPD = BANKPD + DUE
      C     TRANSPORT COSTS DEDUCTED FROM CASH
            CASH = CASH - TRANCO * DUE / YRSEPR(ICROP)
            PRES(ICROP) = 0.
            DUE = 0.
            CASH = CASH + BALAN
          102 CONTINUE
            IF (CASH .LE. 0.) CASH = 0.
      C     DEDUCTION OF SUBSISTENCE CASH NEED
            IF (CASH .LT. SUBNCH) GO TO 530
            GO TO 135
          530 CONTINUE
      C     BUFFERS AGAINST SUBSISTENCE CASH DEFICIT USED
            CDEFIC = SUBNCH - CASH
            CASH = CASH + BUFFER(LOT, CDEFIC)
      C     CALCULATION OF PROPORTIONAL EXPENDITURES ON LOT-PRODUCED
      C     SUBSISTENCE NEEDS
            COSTCM = 0.
            COSTGA = 0.
      C     MEAT REQUIREMENTS SATISFIED:FIRST BY CONVERTING MAIZE TO CHICKENS
      C     AND FROM GAME ALREADY PRESENT, THEN BY PURCHASING GAME IF
      C     AVAILABLE, THEN FROM PURCHASE OF CANNED MEAT
            EAT(13) = EAT(2) * CHICMZ * CWASTE
            EAT(2) = 0.
      C     MEAT EATEN (DRESSED WEIGHT)
            EAT(14) = EATGAM(LOT)
            EATMEA = EAT(13) + EAT(14)
      C     CALCULATION OF MEAT DEFICIT
            DEFMEA = SUKGMT * FAMSIZ(LOT) - EATMEA
            IF (DEFMEA .LE.*0.) GO TO 400
      C     GAME PURCHASED IF AVAILABLE
            IF (SMEAT .LE. 0.) GO TO 401
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241           IF (SMEAT .LE. DEFMEA) GO TO 402
242     C     CASE OF ADEQUATE GAME AVAILABLE FOR SALE TO SATISFY MEAT DEFICIT
243           COSTGA = DEFMEA * YRBUPR(14)
244         402 CONTINUE
245     C     CASE OF INADEQUATE GAME AVAILABLE FOR SALE TO SATISFY FULL MEAT
246     C     DEFICIT
247           COSTGA = SMEAT * YRBUPR(14)
248           DEFMEA = DEFMEA - SMEAT
249         401 CONTINUE
250     C     PURCHASE OF CANNED MEAT
251     C     COST OF CANNED MEAT NEEDED
252           COSTCM = DEFMEA * YRBUPR(17)
253         400 CONTINUE
254           COSTRI = (SUBNRI - EAT(1)) * YRBUPR(1)
255           COSTMN = (SUBNMN - EAT(5) - EAT(6)) * YRBUPR(6)
256           COSTBE = (SUBNBE - EAT(3) - EAT(4)) * YRBUPR(4)
257           COSTRI = AMAX1(COSTRI, 0.)
258           COSTMN = AMAX1(COSTMN, 0.)
259           COSTBE = AMAX1(COSTBE, 0.)
260           COSTGA = AMAX1(COSTGA, 0.)
261           COSTCM = AMAX1(COSTCM, 0.)
262     C     COST OF SUBSISTENCE SUPPLEMENTS
263           COSTSU = COSTRI + COSTMN + COSTBE + COSTGA + COSTCM
264     C     TOTAL SPENT
265           SPENTO = AMIN1(CASH, (SUCASH * FAMSIZ(LOT) + COSTSU))
266     C     SPENT NON-LOT
267           SPENNL = 0.
268           IF (SPENTO .GT. 0.1) SPENNL = (1. - COSTSU / (SUCASH *
269          1 FAMSIZ(LOT) + COSTSU)) * SPENTO
270     C     CALCULATION OF CALORIES, TOTAL PROTEIN AND ANIMAL PROTEIN FROM
271     C     OTHER CASH PURCHASES
272           IF (CASH .LE. 0.) CASH = 0.
273           IF (SPENNL .LE. 0.) SPENNL = 0.
274           EAT(9) =  AMIN1(CASH, SPENNL) / YRBUPR(9)
275           EAT(10) =  AMIN1(CASH, SPENNL) / YRBUPR(10)
276           EAT(11) =  AMIN1(CASH, SPENNL) / YRBUPR(11)
277     C     SPENDING OF CASH FOR SUBSISTENCE NEEDS FOR ITEMS NOT PRODUCED
278     C     IN LOT
279           CASH = CASH - SPENNL
280           IF (CASH .LE. 0.) CASH = 0.
281     C      SPENDING OF CASH ON SUPPLEMENTING LOT-PRODUCED
282     C     PRODUCTS AND GAME + CANNED MEAT
283     C     FOR SUBSISTENCE RICE PURCHASE
284           IF (EAT(1) .GE. (SUBNRI - 0.01)) GO TO 135
285           COSTRI = (SUBNRI - EAT(1)) * YRBUPR(1)
286           IF (COSTRI .LT. CASH) GO TO 133
287           EAT(1) = EAT(1) + CASH / YRBUPR(1)
288           CASH = 0.
289           GO TO 135
290         133 EAT(1) = SUBNRI
291           CASH = CASH - COSTRI
292         135 CONTINUE
293     C     SUBSISTENCE MANIOC PURCHASE (SWEET MANIOC PURCHASED)
294           IF ((EAT(5) + EAT(6)) .GE. (SUBNMN - 0.01)) GO TO 136
295           COSTMN = (SUBNMN - EAT(5) - EAT(6)) * YRBUPR(6)
296           IF (COSTMN .LT. CASH) GO TO 137
297           EAT(6) = EAT(6) + CASH / YRBUPR(6)
298           CASH = 0.
299           GO TO 136
300         137 EAT(6) = SUBNMN - EAT(5)
```

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301           CASH = CASH - COSTMK
302         136 CONTINUE
303       C     SUBSISTENCE BEAN PURCHASE (VIGNA PURCHASED)
304           IF ((EAT(3) + EAT(4)) .GE. (SUBNBE - 0.01)) GO TO 138
305           COSTBE = (SUBNBE - EAT(3) - EAT(4)) * YRBUPR(4)
306           IF (COSTBE .LT. CASH) GO TO 139
307           EAT(4) = EAT(4) + CASH / YRBUPR(4)
308           CASH = 0.
309           GO TO 138
310         139 EAT(4) = SUBNBE - EAT(3)
311           CASH = CASH - COSTBE
312         138 CONTINUE
313           IF (CASH .LE. 0.) GO TO 200
314       C     CALCULATION OF MEAT DEFICIT
315           DEFMEA = SUKGMT * FAMSIZ(LOT) - EATMEA
316           IF (DEFMEA .LE. 0.) GO TO 200
317       C     GAME PURCHASED IF AVAILABLE
318           IF (SMEAT .LE. 0.) GO TO 201
319           IF (SMEAT .LE. DEFMEA) GO TO 202
320       C     CASE OF ADEQUATE GAME AVAILABLE FOR SALE TO SATISFY MEAT DEFICIT
321           COSTGA = DEFMEA * YRBUPR(14)
322           IF (COSTGA .GE. CASH) GO TO 203
323           EAT(14) = EAT(14) + DEFMEA
324           SMEAT = SMEAT - DEFMEA
325           CASH = CASH - COSTGA
326           GO TO 200
327         203 CONTINUE
328       C     CASE OF INADEQUATE CASH TO BUY AVAILABLE GAME
329           EAT(14) = EAT(14) + CASH / YRBUPR(14)
330           CASH = 0.
331           GO TO 200
332         202 CONTINUE
333       C     CASE OF INADEQUATE GAME AVAILABLE FOR SALE TO SATISFY FULL MEAT
334       C     DEFICIT
335           COSTGA = SMEAT * YRBUPR(14)
336           IF (COSTGA .GE. CASH) GO TO 203
337           EAT(14) = EAT(14) + SMEAT
338           CASH = CASH - SMEAT * YRBUPR(14)
339           DEFMEA = DEFMEA - SMEAT
340           SMEAT = 0.
341           IF (CASH .LE. 0.) GO TO 200
342         201 CONTINUE
343       C     PURCHASE OF CANNED MEAT
344       C     COST OF CANNED MEAT NEEDED
345           COSTCM = DEFMEA * YRBUPR(17)
346           IF (COSTCM .GE. CASH) GO TO 204
347           EAT(17) = EAT(17) + DEFMEA
348           CASH = CASH - DEFMEA * YRBUPR(17)
349           GO TO 200
350         204 CONTINUE
351           IF (CASH .LE. 0.) GO TO 200
352       C     CASE OF INADEQUATE CASH TO SATISFY MEAT DEFICIT THROUGH CANNED
353       C     MEAT PURCHASE
354           EAT(17) = EAT(17) + CASH/ YRBUPR(17)
355           CASH=0.
356         200 CONTINUE
357       C     CASH RESERVED FOR SEED PURCHASE KEPT AS INVESTMENT CAPITAL
358           CAPIT(LOT) = CAPIT(LOT) + SEEDCN
359       C     DECISION FOR "VOLUNTARY" PAYMENT OF BANK
360           IF (CASH .LE. 0.) GO TO 857
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361           XRAN = ARAND(INIT, -1.)
362           IF (XRAN .GE. PRVOLP) GO TO 126
363           IF (CASH .GE. DUE) GO TO 128
364           DUE = DUE - CASH
365           CASH = 0.
366           GO TO 126
367         128 CASH = CASH - DUE
368           DUE = 0.
369         126 CONTINUE
370     C     PAYMENT OF PRIVATE LOANS
371           IF (CASH .LE. 0.1) GO TO 857
372     C     CALCULATION OF AMOUNT OF PRIVATE LOANS OUTSTANDING
373           PRIVLO = 0.
374           DO 850 LOAN=1, MAXNLO
375         850 IF (LOANTY(LOT, LOAN) .EQ. 12) PRIVLO=PRIVLO + AMTLO(LOT, LOAN)
376           IF (PRIVLO .LT. 1.) GO TO 857
377     C     DETERMINATION IF ANY PAYMENT IS MADE FROM PROBABILITY OF PRIVATE
378     C     LOAN PAYMENT
379           XRAN = ARAND(INIT, -1.)
380           IF (XRAN .LT. PPLPAY) GO TO 851
381           GO TO 857
382         851 IF (CASH .GE. PRIVLO) GO TO 852
383           AMTPD = CASH
384           CASH = 0.
385           GO TO 853
386         852 AMTPD = PRIVLO
387           CASH = CASH - PRIVLO
388         853 CONTINUE
389     C     ADJUSTMENT OF LOAN TOTALS FOR AMOUNT PAID
390           DO 854 LO=1, MAXNLO
391           IF (LOANTY(LOT, LO) .EQ. 12) GO TO 855
392           GO TO 854
393         855 IF ((AMTPD + 0.1) .GE. AMTLO(LOT, LO)) GO TO 856
394           AMTLO(LOT, LO) = AMTLO(LOT, LO) - AMTPD
395           GO TO 857
396         856 CONTINUE
397     C     LIQUIDATION OF PRIVATE LOAN IF AMOUNT PAID EQUALS OR EXCEEDS LOAN
398           AMTPD = AMTPD - AMTLO(LOT, LO)
399           LOANDA(LOT, LO) = 0
400           LOANTY(LOT, LO) = 0
401           AMTLO(LOT, LO) = 0.
402         854 CONTINUE
403         857 CONTINUE
404           IF (CASH .LE. 0.) CASH = 0.
405     C     SUBTRACTION OF CASH PAID TO OUTSIDE
406           IF (IYR .GT. 1 .OR. LOT .GT. 1) GO TO 352
407           CASOUT = 0.
408           CHOUT = 0.
409         352 IF (CASOUT .LE. 0.1) CASOUT =
410            1 AMAX1(SNGL(BRAND(DBLE(CSENSD), DBLE(CSENME))), 0.)
411     C     SELECTION OF FIRST COLONIST TO BE TESTED FOR OUTSIDE CASH
412     C     SENDING
413           IF (CASOUT .GE. 0.1 .AND. ARAND(INIT, -1.) .LT. PCSENT)
414            1 CHOUT = CASOUT
415           IF (CASH .LE. CHOUT) GO TO 350
416     C     CASH PAID TO OUTSIDE TAKEN FROM FIRST COLONIST THAT CAN
417     C     AFFORD IT
418           CASH = CASH - CHOUT
419           CASOUT = 0.
420           CHOUT = 0.
```

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  421       350 CONTINUE
  422     C     CASH STANDARD OF LIVING FOR CARRYING CAPACITY STANDARD COMPARISONS
  423           CASHPL = CASH + SPENNL
  424           CALL MEASUR(LOT, 2, CASHPL)
  425           IF (CASH .LE. 0.1) GO TO 129
  426     C     ALLOCATION OF CASH TO INVESTMENT AND CONSUMPTION
  427           CALL CASHAL(LOT, CASH)
  428       129 CONTINUE
  429     C     TUBERS EATEN ADDED TO CALORIES AND TOTAL PROTEIN
  430           EAT(9) = EAT(9) + TUBCAL * FAMSIZ(LOT)
  431           EAT(10) = EAT(10) + TUBTP / 1000. * FAMSIZ(LOT)
  432     C     PAYMENT OF BANK
  433           CALL PAYBNK(LOT, BANKPD)
  434     C     DETERMINATION OF BANK SOLVENCY
  435           ISOLV(LOT) = 1
  436           IF (DUE .GT. 0.01) ISOLV(LOT) = 2
  437     C     ADJUSTMENT OF AMOUNTS EATEN AND STORED AS SEED FOR SPOILAGE IN
  438     C     STORAGE (SEPARATE SPOILAGE RATES FOR SEEDS AND PRODUCT)
  439           DO 142 IPROD = 1,6
  440           SPOILP = SNGL(BRAND(DBLE(SPOISD(IPROD)), DBLE(SPOIME(IPROD))))
  441           EAT(IPROD) = EAT(IPROD) *(1. - SPOILP)
  442           IF (IPROD .GT. 4) GO TO 142
  443           SPOILS = SNGL(BRAND(DBLE(SPOSSD(IPROD)), DBLE(SPOSME(IPROD))))
  444           SEEDST(LOT, IPROD) = SEEDST(LOT, IPROD) * (1. - SPOILS)
  445       142 CONTINUE
  446           RETURN
  447           END
END OF FILE
```

PRICES

Purpose:	sets buying and selling prices for the year.
Kind of routine:	subroutine
Arguments:	none
COMMON areas:	COSTS, PRIC
Routines called:	BRAND
Routine called by:	MAIN
Program size:	462 bytes

```
      1            SUBROUTINE PRICES
      2      C     PRICES SUBROUTINE: SETS BUYING AND SELLING PRICES FOR YEAR
      3            DOUBLE PRECISION BRAND
      4            COMMON/COSTS/ COLAB(12), BUYME(17), BUYSD(17), SELLME(17),
      5           I SELLSD(17)
      6            COMMON/PRIC/ YRBUPR(17), YRSEPR(17)
      7            EXTERNAL BRAND
      8            DO 100 IPROD = 1, 17
      9            YRBUPR(IPROD) = SNGL(BRAND(DBLE(BUYSD(IPROD)),
     10           1 DBLE(BUYME(IPROD))))
     11            YRSEPR(IPROD) = SNGL(BRAND(DBLE(SELLSD(IPROD)),
     12           1 DBLE(SELLME(IPROD))))
     13        100 CONTINUE
     14            RETURN
     15            END
END OF FILE
```

PROBLU

Purpose:	probability of land use: returns the probabili of a single crop being used as a cash crop. (examined patchwise).
Kind of routine:	function (single precision)
Arguments:	LOT lot number LUCOD land use code (for single crops) (see codes section)
COMMON areas:	COLON
Routines called:	none
Routine called by:	LUALLO
Program size:	946 bytes

```
      FUNCTION PRCBLU(LOT, LUCOD)
C     LAND USE PRCBABILITY FUNCTICN RETURNS THE PROBABILITY OF A GIVEN
C     SINGLE CROP LAND USE AS A CASH CROP GIVEN AS ARGUMENTS THE LOT
C     AND THE LANC USE CODE FOR THE CROP
      COMMCN/USEPR/ PLU(4, 10), PCAGPE, PPEGCA
      COMMON/COLON/ LUPAT(10), CAPIT(10), CGOODS(10), AREACL(10),
     1 FAMLAB(10), MALES(10), FAMSIZ(10), CGOENT(10), CAPCON(10),
     2 MORTYP(10), IORIG(10), CGOCON(10), CAPENT(10)
      IF(LUCOD .EQ.  5) GO TC 101
      IF(LUCOD .EQ.  7) GO TC 102
      IF(LUCOD .EQ.  8) GO TC 103
      IF(LUCOD .EQ. 10) GO TC 104
      IF(LUCOD .EC. 12) GO TC 105
      IF(LUCOD .EC. 16) GO TC 106
      IF(LUCOD .EC. 20) GO TC 107
      IF(LUCOD .EC. 21) GO TC 108
      IF(LUCOD .EC. 18) GO TC 109
      IF(LUCOD .EC. 23) GO TC 110
      WRITE (6, 3001) LUCOD
 3001 FORMAT(1X, 'ERROR: LAND USE CODE', I5, 2X,
     1 'NOT RECOGNIZED IN PRCBLU')
      CALL SYSTEM
  101 ICL = 1
      GO TO 200
  102 ICL = 2
      GO TO 200
  103 ICL = 3
      GO TO 200
  104 ICL = 4
      GO TO 200
  105 ICL = 5
      GO TO 200
  106 ICL = 6
      GO TO 200
  107 ICL = 7
      GO TO 200
  108 ICL = 8
      GO TO 200
  109 ICL = 9
      GO TO 200
  110 ICL = 10
  200 CONTINUE
      PROBLU = PLU(LUPAT(LOT), ICL)
      RETURN
      END
END OF FILE
```

PSYLD

Purpose:	Phaseolus yield
Kind of routine:	subroutine
Arguments:	LOT lot number
	IPCH patch number
COMMON areas:	SOIL, USECOM, RANDOM, YIELDS, HISTOR, TECHN
Routines called:	ARAND, BRAND
Routine called by:	LOTPRO
Program size:	1644 bytes

```
      SUBROUTINE PSYLD(LOT, IPCH)
C     PHASEOLUS YIELD SUBROUTINE
      DOUBLE PRECISION BRAND
      DOUBLE PRECISION PHOS, PH, AL, NITRO, CARB, CLAY, SLOPE,
     1 PRYL, PHADJ, PRYLME, DMZ, VBLTYD
      COMMON/SOIL/ PHOS(10,100), PH(10,100), AL(10,100),
     1 NITRO(10,100), CARB(10,100), CLAY(10,100), SLOPE(10,100)
      COMMON/USECOM/ LUSE(10,100), IDUR(10,100), LASTUS(10,100),
     1 CONTIN(10,100)
      COMMON/RANDOM/ INIT
      COMMON/YILLDS/ YLDRI, YLDMZ, YLDPS, YLDVI, YLDBM, YLDSM, YLDPE,
     1 YLDCA, YLDPA
      COMMON/TECHN/ TECH(9), START(9)
      COMMON/HISTOR/ VIRGSO(10,100)
      COMMON/YLDCAL/ ICRCAL(11)
      DIMENSION DMZ(2)
      EXTERNAL ARAND, BRAND
C     DISEASE MULTIPLIER INITIALIZATION
      DISMUL = 1.
      IF (LUSE(LOT, IPCH) .EQ. 9) GO TO 200
C     PHASEOLUS WITHOUT MAIZE
C     CROP CODE
      ICCO = 7
C     MAIZE DENSITY CODE (1=WITHOUT MAIZE 2=WITH MAIZE)
      MDCODE = 1
C     MAIZE DENSITY
      DMZ(1) = 0.
      GO TO 201
  200 CONTINUE
C     PHASEOLUS WITH MAIZE
      ICCO = 8
      MDCODE = 2
      IF (ICRCAL(8) .GE. 1) GO TO 201
C     FIRST CALL FOR PHASEOLUS WITH MAIZE
      DMZ(2) = BRAND(3.638D3, 6.698D3)
      IF (DMZ(2) .LE. 0.) DMZ(2) = 0.
  201 CONTINUE
      IF (MAXO(ICRCAL(7), ICRCAL(8)) .GE. 1) GO TO 202
C     FOR FIRST CALL FOR ANY PHASEOLUS COMBINATION FOR LOT AND YEAR
C     PHASEOLUS SEED DENSITY (KG SEEDS SOWN / HA) ASSIGNMENT
      SEEDDE = SNGL(BRAND(2.612D1, 2.919D1))
      IF (SEEDDE .LE. 0.) SEEDDE = 0.
C     PHASEOLUS PLANTING DENSITY (PLANTS / HA) CALCULATION
      DEPSME = 1602.8 * SEEDDE
      DENSPS = SNGL(BRAND(5.5966D4, DBLE(DEPSME)))
      IF (DENSPS .LE. 1.0) DENSPS = 1.0
C     FOR DISEASED PHASEOLUS (RHIZOCTONIA)
      DDMUL = SNGL(BRAND(5.7D-1, 3.5D-1))
      IF (DDMUL .LE. 0.) DDMUL = 0.
C     PH ADJUSTMENT FOR RESPONSE PLATEAU
      PHADJ = 5.7
      IF (PH(LOT, IPCH) .LE. PHADJ) PHADJ = PH(LOT, IPCH)
C     CALCULATION OF REGRESSION PREDICTED YIELD (KG / KG SEED SOWN)
      PRYLME = 13.78 * PHADJ - 69.77 *ALOG10(DENSPS) - 1.50E-3 *
     1 DMZ(MDCODE) + 267.64
      PRYL = BRAND(2.98D1, PRYLME)
C     VARIABILITY DIFFERENCE
      VBLTYD = PRYL - PRYLME
  202 CONTINUE
C     CROP CALL CODE SET
```

```
      61            ICRCAL(ICCO) = 1
      62      C     DISEASE DECISION
      63            IF (VIRGSO(LOT, IPCH) .EQ. 2) GO TO 100
      64      C     FOR PLANTING IN VIRGIN SOIL
      65            XRAN = ARAND(INIT, -1.)
      66            IF (XRAN .LT. 0.909) GO TO 101
      67            GO TO 102
      68        101 CONTINUE
      69            XRAN = ARAND(INIT, -1.)
      70            IF (XRAN .LT. 0.78) GO TO 100
      71            GO TO 102
      72        100 CONTINUE
      73      C     FOR DISEASED PHASEOLUS (RHIZOCTONIA)
      74            DISMUL = DDMUL
      75        102 CONTINUE
      76      C     PH ADJUSTMENT FOR RESPONSE PLATEAU
      77            PHADJ = 5.7
      78            IF (PH(LOT, IPCH) .LT. PHADJ) PHADJ = PH(LOT, IPCH)
      79      C     CALCULATION OF REGRESSION PREDICTED YIELD (KG / KG SEED SOWN)
      80            PRYLNE = 13.78 * PHADJ - 69.77 *ALOG10(DENSPS) - 1.50E-3 *
      81           1 DMZ(MDCODE)  + 267.64
      82      C     CALCULATION OF PHASEOLUS YIELD (KG/HA)
      83            PRYL = PRYLNE + VDLTYD
      84            IF (PRYL .LE. 0.) PRYL = 0.
      85            YLDPS = PRYL * SEDDDE * DISMUL
      86      C     ADJUSTMENT FOR TECHNOLOGICAL IMPROVEMENT
      87            YLDPS = YLDPS * TECH(3)
      88            IF (YLDPS .LE. 0.0) YLDPS = 0.0
      89            RETURN
      90            END
END OF FILE
```

RIYLD

Purpose:	rice yield
Kind of routine:	subroutine
Arguments:	LOT lot number
	IPCH patch number
COMMON areas:	SOIL, USECOM, RANDOM, TECHN, YIELDS
Routines called:	ARAND, BRAND
Routine called by:	LOTPRO
Program size:	2700 bytes

```
      SUBROUTINE RIYLD(LOT, IPCH)
C     RICE YIELD SUBROUTINE
      DOUBLE PRECISION BRAND
      DOUBLE PRECISION PHOS, PH, AL, NITRO, CARB, CLAY, SLOPE,
     1 PRYL, PRYLMX, YLDMAX, CADJ, PADJ, DMZ, VBLTYD
      COMMON/YLDCAL/ ICRCAL(11)
      COMMON/SOIL/ PHOS(10,100), PH(10,100), AL(10,100),
     1 NITRO(10,100), CARB(10,100), CLAY(10,100), SLOPE(10,100)
      COMMON/USECOM/ LUSE(10,100), IDUR(10,100), LASTUS(10,100),
     1 CONTIN(10,100)
      COMMON/RANDOM/ INIT
      COMMON/YIELDS/ YLDRI, YLDMZ, YLDPS, YLDVI, YLDBM, YLDSM, YLDPE,
     1 YLDCA, YLDPA
      COMMON/TECHN/ TECH(9), START(9)
      DIMENSION DMZ(2)
C     INITIALIZATION OF PASTURE AND OTHER INTERPLANTED CROP MULTIPLIERS
C     AND MAIZE DENSITY
      PAMUL = 1.0
      OICMUL = 1.0
C     LAND USE MULTIPLIERS ASSIGNED
      LU = LUSE(LOT, IPCH)
      IF (LU .EQ. 19) PAMUL = 0.81
      IF (LU .EQ.  9 .OR. LU .EQ. 13) OICMUL = 0.81
      IF (LU .EQ. 15 .OR. LU .EQ. 16) OICMUL = 0.81
      IF (LU .EQ. 17)OICMUL = 0.81
      IF (LU .EQ.  6 .OR. LU .EQ. 15 .OR. LU .EQ. 17) GO TO 200
C     RICE WITH NO MAIZE
C     CROP CODE
      ICCO = 1
C     MAIZE DENSITY
      DMZ(1) = 0.
      GO TO 201
  200 CONTINUE
C     RICE WITH MAIZE
      ICCO = 2
      IF (ICRCAL(2) .EQ. 1) GO TO 201
C     FIRST CALL FOR RICE AND MAIZE
      DMZ(2) = BRAND(3.444D3, 3.507D3)
      IF (DMZ(2) .LE. 0.) DMZ(2) = 0.
  201 CONTINUE
      IF (MAX0(ICRCAL(1), ICRCAL(2)) .GE. 1) GO TO 202
C     FIRST CALL FOR ANY CROP COMBINATION FOR LOT AND YEAR
C     INITIALIZATION OF DISEASE, TOPPLING AND VARIETY MULTIPLIERS
      DISMUL = 1.0
      TOPMUL = 1.0
      VARMUL = 1.0
      DENS = SNGL(BRAND(6.879D1, 1.0967D2))
      IF (DENS .LE. 0.) DENS = 0.
C     ASSIGNMENT OF VARIETY
      XRAN = ARAND(INIT, -1.)
      IF (XRAN .LT. 0.844) GO TO 100
      IF (XRAN .GE. 0.844 .AND. XRAN .LT. 0.900) GO TO 101
      IF (XRAN .GE. 0.900) GO TO 102
  100 CONTINUE
C     FOR HYBRID VARIETIES (IAC1246 & IAC101)
      XRAN = ARAND(INIT, -1.)
      IF (XRAN .LT. 0.019) DISMUL = 0.806
      XRAN = ARAND(INIT, -1.)
      IF (XRAN .LT. 0.133) TOPMUL = SNGL(BRAND(5.6D-1, 7.6D-1))
      IF (TOPMUL .LE. 0.) TOPMUL = 0.
```

```
      GO TO 103
  101 CONTINUE
C     FOR "OTHER" VARIETIES
      XRAN = ARAND(INIT, -1.)
      IF (XRAN .LT. 0.143) DISMUL = 0.806
      VARMUL = 0.823
  103 CONTINUE
C     FOR BOTH HYBRID AND "OTHER" VARIETIES - CALCULATION OF EXPERIMENT
C     STATION YIELD
      IF (DENS .LE. 111.) ESYLD = 27.9 * DENS
      IF (DENS .GT. 111. .AND. DENS .LT. 222.) ESYLD = 8.72 * DENS  +
     1 2166.
      IF (DENS .GE. 222.)ESYLD = 4102.
      GO TO 104
  102 CONTINUE
C     FOR TRADITIONAL VARIETY (CANELA DE FERRO)
      XRAN = ARAND(INIT, -1.)
      IF (XRAN .LT. 0.120) DISMUL = 0.806
      IF (DENS .LT. 111.) ESYLD = 20.5 * DENS
      IF (DENS .GE. 111.) ESYLD = 2278.
  104 CONTINUE
C     INITIALIZATION OF GERMINATION AND SEASON MULTIPLIERS
      GERMUL = 1.0
      SEAMUL = 1.0
C     POOR GERMINATION DECISION
      XRAN = ARAND(INIT, -1.)
      IF (XRAN .LT. 0.047) GERMUL = 0.79
C     OUT OF SEASON PLANTING DECISION
      XRAN = ARAND(INIT, -1.)
      IF (XRAN .LT. 0.034) SEAMUL = SNGL(BRAND(2.3D-1, 1.7D-1))
      IF (SEAMUL .LE. 0.) SEAMUL = 0.
C     CARBON & PHOSPHORUS ADJUSTMENT FOR RESPONSE PLATEAU
      CADJ = 2.0
      IF (CARB(LOT, IPCH) .LE. CADJ) CADJ = CARB(LOT, IPCH)
      PADJ = 12.0
      IF (PHOS(LOT, IPCH) .LE. PADJ) PADJ = PHOS(LOT, IPCH)
C     CALCULATION OF PREDICTED YIELD FROM REGRESSION (PROPORTION)
      PRYLME = 0.59699 * CADJ - 1.5236E-5 * DMZ(ICCO) + 1.6996E-2 * PADJ
     1 - 9.4706E-2 * AL(LOT, IPCH) - 6.0286E-3
      PRYL = BRAND(2.0288D-1, PRYLME)
C     VARIABILITY DIFFERENCE
      VBLTYD = PRYL - PRYLME
  202 CONTINUE
C     CROP CALL CODE (0=NO PREVIOUS CALLS FOR LOT AND YEAR  1=PREVIOUS CALLS)
      ICRCAL(ICCO) = 1
C     CARBON & PHOSPHORUS ADJUSTMENT FOR RESPONSE PLATEAU
      CADJ = 2.0
      IF (CARB(LOT, IPCH) .LE. CADJ) CADJ = CARB(LOT, IPCH)
      PADJ = 12.0
      IF (PHOS(LOT, IPCH) .LE. PADJ) PADJ = PHOS(LOT, IPCH)
C     CALCULATION OF PREDICTED YIELD FROM REGRESSION (PROPORTION)
      PRYLME = 0.59699 * CADJ - 1.5236E-5 * DMZ(ICCO) + 1.6996E-2 * PADJ
     1 - 9.4706E-2 * AL(LOT, IPCH) - 6.0286E-3
C     CALCULATION OF MAXIMUM EXPECTED YIELD
      PRYL = PRYLME + VBLTYD
      IF (PRYL .LE. 0.) PRYL = 0.
      YLDMAX = ESYLD * PRYL
C     CALCULATION OF RICE YIELD (KG / HA)
      YLDRI = YLDMAX * TOPMUL * SEAMUL * PAMUL * OICMUL * GERMUL *
     1 DISMUL
```

```
  121      C     ADJUSTMENT FOR TECHNOLOGICAL IMPROVEMENT
  122            YLDRI = YLDRI * TECH(1)
  123            IF (YLDRI .LE. 0.) YLDRI = 0.
  124            RETURN
  125            END
END OF FILE
```

SEEDS

Purpose:	seed need (SEEDN) and seed cash need (SEEDCN) calculation (the amounts by which seed stored and capital (CAPIT) have been reduced prior to a labor and capital sufficiency check using the LABOR function.)
Kind of routine:	subroutine
Arguments:	LOT lot number IPROD product code
COMMON areas:	PROD, DATE, SEEDNE, COSTS, SIZES, PRIC
Routines called:	IFINAN
Routine called by:	LUALLO
Program size:	1296 bytes

```
      SUBROUTINE SEEDS(LCT, IPROD)
C     SEEDS SUBROUTINE CALCULATES SEED NEED (SEEDN)(THE AMOUNT WHICH
C     SEED STORED (SEEDST) HAS BEEN REDUCED FOR LABOR-CAPITAL SUFFICIENCY
C     CHECK - THIS MUST BE RESTORED IF CHECK UNSUCCESSFUL), AND SEED
C     CASH NEED (SEEDCN)(THE SIMILAR AMOUNT BY WHICH CAPIT HAS BEEN
C     REDUCED WHICH MUST BE RESTORED IF LABOR CHECK NEGATIVE).
C     ARGUMENTS ARE LOT AND PRODUCT CODE (FIRST FOUR CODES OF "COSTS"
C     PRODUCT CODES).
      DIMENSION  NPSF(4), ICALL(4)
      COMMON/PROD/ PRES(17), SEEDST(10, 4), SEED(4)
      COMMON/DATE/ IYR
      COMMON/PRIC/ YRBUPR(17), YRSEPR(17)
      COMMON/SEEDNF/ SEEDN, SEEDCN, ISCALL
      COMMON/COSTS/ COLAB(12), BUYME(17), BUYSD(17), SELLME(17),
     1 SELLSC(17)
      COMMON/SIZES/ LOTS, NOPCHS, SIZLOT, SIZPCH
      IF (IPROD .LE. 3) IOPER = IPROD + 3
      IF (IPROD .EQ. 4) IOPER = 6
      IF (IPROD .GE. 5) GO TO 400
      GO TO 401
  400 WRITE (6, 1000) IPROD
 1000 FORMAT(1X, 'ERROR: IPROD', I5, 2X, 'NOT RECOGNIZED IN SEEDS')
      CALL SYSTEM
  401 CONTINUE
      IF (ISCALL .EQ. 0) GO TO 150
      GO TO 110
  150 CONTINUE
C     FIRST CALL FOR LOT AND YEAR
      ISCALL = 1
      DO 101 IP = 1, 4
  101 ICALL(IP) = 1
  110 CONTINUE
      SEEDRQ = SEED(IPROD) * SIZPCH
      IF (SEEDST(LOT, IPROD) .GE. SEEDRQ) GO TO 102
      SEEDN = SEEDST(LOT, IPROD)
      SEEDST(LOT, IPROD) = 0.
      IF (ICALL(IPROD) .EQ. 1) GO TO 103
      GO TO 105
  103 ICALL(IPROD) = 2
C     DETERMINATION OF NUMBER OF PATCHES WITH INCRA FINANCED SEEDS
      NPSF(IPROD) = IFINAN(LOT, IOPER, 100., 6)
      SEEDSF = FLOAT(NPSF(IPROD)) * SEED(IPROD) * SIZPCH
      SEEDST(LOT, IPROD) = SEEDST(LOT, IPROD) + SEEDSF
      IF (SEEDST(LOT, IPROD) .GE. SEEDRQ) GO TO 102
  105 SEEDCN = (SEEDRQ - SEEDST(LOT, IPROD)) * YRBUPR(IPROD)
      SEEDN = SEEDST(LOT, IPROD)
      SEEDST(LOT, IPROD) = 0.
      GO TO 900
  102 CONTINUE
C     FOR CASE OF SUFFICIENT STORED SEED STOCKS
      SEEDST(LOT, IPROD) = SEEDST(LOT, IPROD) - SEEDRQ
      SEEDCN = 0.
      SEEDN = SEEDRQ
  900 CONTINUE
      RETURN
      END
END OF FILE
```

SGBQ

Purpose:	second growth burn quality: predicts burn quality from weather information.
Kind of routine:	subroutine
Arguments:	LOT lot number
	IPCH patch number
COMMON areas:	DATE, RANDOM, BURNS, BQCALL, WEATOT
Routines called:	WEABD, IDAGYR, ARAND, BRAND
Routine called by:	ALLOC
Program size:	1714 bytes

```
      SUBROUTINE SGBQ(LOT, IPCH)
C     SECOND GROWTH BURN QUALITY PREDICTION SUBROUTINE
      DOUBLE PRECISION BRAND
      INTEGER BUQUAL, BUTYP
      COMMON/DATE/ IYR
      COMMON/BQCALL/ LLOTV, LYRV, LLOTSG, LYRSG, LLOTW, LYRW
      COMMON/RANDOM/ INIT
      COMMON/BURNS/ BUTYP(10,100), BUQUAL(10,100)
      COMMON/WEATOT/ RAINSU, EVAPSU, RINSSU
      EXTERNAL IDAGYR, ARAND, BRAND
C     FOLLOWING ASSIGNS BURN QUALITY OF THE FIRST SECOND GROWTH PATCH
C     IN LOT FOR A GIVEN YEAR TO ANY SUBSEQUENT SECOND GROWTH BURNS IN
C     THAT LOT AND YEAR.
      IF (IYR .NE. LYRSG) GO TO 200
      IF (LOT .EQ. LLOTSG) GO TO 201
      LLOTSG = LOT
      GO TO 200
  201 BUQUAL(LOT, IPCH) = LSTCBQ
      GO TO 102
  200 CONTINUE
      LLOTSG = LOT
C     ASSIGNMENT OF CALENDAR MONTH OF CUTTING
      XRAN = ARAND(INIT, -1.)
      IF (XRAN .LT. 0.009) MOCUT = 6
      IF (XRAN .GE. 0.009 .AND. XRAN .LT. 0.081) MOCUT = 7
      IF (XRAN .GE. 0.081 .AND. XRAN .LT. 0.153) MOCUT = 8
      IF (XRAN .GE. 0.153 .AND. XRAN .LT. 0.504) MOCUT = 9
      IF (XRAN .GE. 0.504 .AND. XRAN .LT. 0.718) MOCUT = 10
      IF (XRAN .GE. 0.718 .AND. XRAN .LT. 0.898) MOCUT = 11
      IF (XRAN .GE. 0.898 .AND. XRAN .LT. 0.988) MOCUT = 12
      IF (XRAN .GE. 0.988) MOCUT = 1
      XRAN = ARAND(INIT, -1.)
      ICUTDM = INT(XRAN * 30.)
      ICUTDY = IDAGYR(ICUTDM, MOCUT)
C     ASSIGNMENT OF DAYS BETWEEN CUTTING AND BURNING
      DBCB = SNGL(BRAND(9.6D1, 5.3D1))
      IDBCB = IFIX(DBCB)
      IF (IDBCB .LT. 1) IDBCB = 1
C     CALCULATION OF BURNING DAY OF YEAR
      IBUDYR = ICUTDY + IDBCB
C     CALCULATION OF WEATHER BETWEEN CUTTING AND BURNING
      CALL WEABD(ICUTDY, IBUDYR)
      RAINCB = RAINSU
      EVAPCB = EVAPSU
      RINSCB = RINSSU
C     CALCULATION OF BURN DISCRIMINANT FUNCTIONS
      GOOD = -3.38E-3 * RAINCB + 2.06E-2 * EVAPCB + 6.09E-4 * RINSCB
     1 - 1.00
      BAD = -4.84E-4 * RAINCB + 1.39E-2 * EVAPCB - 2.90E-3 * RINSCB
     1 - 0.237
C     BURN QUALITY DECISION
      IF (GOOD .GT. BAD) GO TO 100
      GO TO 101
  100 CONTINUE
C     FOR CASE OF GOOD BURN PREDICTED BY DISCRIMINANT FUNCTION
      XRAN = ARAND(INIT, -1.)
      BUQUAL(LOT, IPCH) = 1
      IF (XRAN .LT. 0.643) BUQUAL(LOT, IPCH) = 2
      GO TO 102
  101 CONTINUE
```

```
      C     FOR CASE OF BAD BURN PREDICTED BY DISCRIMINANT FUNCTION
            XRAN = ARAND(INIT, -1.)
            BUQUAL(LOT, IPCH) = 1
            IF (XRAN .LT. 0.350) BUQUAL(LOT, IPCH) = 2
        102 CONTINUE
            LSTCBQ = BUQUAL(LOT, IPCH)
            LYRSG = IYR
            BUTYP(LOT, IPCH) = 2
            RETURN
            END
END OF FILE
```

SMYLD

Purpose:	sweet manioc yield
Kind of routine:	subroutine
Arguments	LOT lot number
	IPCH patch number
COMMON areas:	SOIL, USECOM, YIELDS, TECHN
Routines called:	BRAND
Routine called by:	LOTPRO
Program size:	998 bytes

```
      1            SUBROUTINE SMYLD(LOT, IPCH)
      2      C     SWEET MANIOC YIELD SUBROUTINE
      3            DOUBLE PRECISION BRAND
      4            DOUBLE PRECISION PHOS, PH, AL, NITRO, CARB, CLAY, SLOPE,
      5           1 PRYLME, PRYL, PHADJ, VBLTYD
      6            COMMON/SOIL/ PHOS(10,100), PH(10,100), AL(10,100),
      7           1 NITRO(10,100), CARB(10,100), CLAY(10,100), SLOPE(10,100)
      8            COMMON/TECHN/ TECH(9), START(9)
      9            COMMON/USECOM/ LUSE(10,100), IDUR(10,100), LASTUS(10,100),
     10           1 CONTIN(10,100)
     11            COMMON/YIELDS/ YLDRI, YLDMZ, YLDPS, YLDVI, YLDBM, YLDSM, YLDPE,
     12           1 YLDCA, YLDPA
     13            COMMON/YLDCAL/ ICRCAL(11)
     14      C     FOLLOWING PREVENTS MANIOC YIELD FROM BEING COUNTED
     15      C     MORE THAN ONCE.  YIELDS HERE ARE ONLY COUNTED IN
     16      C     THE FIRST YEAR.  A NEGATIVE YIELD IS RETURNED TO
     17      C     THE LOTPRO SUBROUTINE TO INDICATE A SECOND YEAR
     18      C     FIELD FOR WHICH THE YIELD IS NOT TO BE COUNTED
     19            YLDSM = -1.0
     20            IF (IDUR(LOT, IPCH) .GE. 365) GO TO 900
     21            IF (ICRCAL(11) .GE. 1) GO TO 100
     22      C     FIRST CALL FOR LOT AND YEAR
     23            ICRCAL(11) = 1
     24      C     INITIALIZATION OF GROWTH PERIOD MULTIPLIER
     25            GTHMUL = 1.0
     26      C     ASSIGNMENT OF GROWTH PERIOD (DAYS)
     27            GTHPER = SNGL(BRAND(1.03D2, 4.71D2))
     28            IF (GTHPER .LE. 0.) GTHPER = 0.
     29      C     PH ADJUSTMENT FOR RESPONSE PLATEAU
     30            PHADJ = 5.0
     31            IF (PH(LOT, IPCH) .LE. PHADJ) PHADJ = PH(LOT, IPCH)
     32      C     REGRESSION PREDICTED YIELD (KG FARINHA / HA / 12 MONTHS GROWTH)
     33            PRYLME = 567.5 * PHADJ - 1559.2
     34            PRYL = BRAND(6.15D1, PRYLME)
     35            VBLTYD = PRYL - PRYLME
     36      C     ASSIGNMENT OF GROWTH PERIOD MULTIPLIER
     37            IF (GTHPER .LT. 365.) GTHMUL = SNGL(BRAND(3.74D0, 3.77D0))
     38            IF (GTHMUL .LE. 0.) GTHMUL = 0.
     39        100 CONTINUE
     40      C     PH ADJUSTMENT FOR RESPONSE PLATEAU
     41            PHADJ = 5.0
     42            IF (PH(LOT, IPCH) .LE. PHADJ) PHADJ = PH(LOT, IPCH)
     43      C     REGRESSION PREDICTED YIELD (KG FARINHA / HA / 12 MONTHS GROWTH)
     44            PRYLME = 567.5 * PHADJ - 1559.2
     45      C     SWEET MANIOC YIELD CALCULATION (KG FARINHA / HA)
     46            PRYL = PRYLME + VBLTYD
     47            IF (PRYL .LE. 0.) PRYL = 0.
     48            YLDSM = PRYL * GTHPER / 365. * GTHMUL
     49            IF (YLDSM .LE. 0.) YLDSM = 0.
     50      C     ADJUSTMENT FOR TECHNOLOGICAL IMPROVEMENT
     51            YLDSM = YLDSM * TECH(6)
     52        900 CONTINUE
     53            RETURN
     54            END
END OF FILE
```

SOILCH

Purpose:	soil changes: changes in soil fertility levels as a result of various burning, cropping, and fallowing treatments.
Kind of routine:	subroutine
Arguments:	LOT lot number IPCH patch number
COMMON areas:	UTCOM, BURNS, SOIL, UBCHNG, BUCHNG, BEFORE, FERT
Routines called:	UNBUCH, PASTSO, VBUEFF, CBUEFF, WBUEFF, BRAND
Routine called by:	MAIN
Program size:	2364 bytes

```
      SUBROUTINE SOILCH(LOT, IPCH)
C     SOIL CHANGE SUBROUTINE
      INTEGER BUQUAL, BUTYP
      DOUBLE PRECISION BRAND, DMIN1
      DOUBLE PRECISION PHOS, PH, AL, NITRO, CARB, CLAY, SLOPE, PHCH,
     1 ALCH, PCH, RNCH, CCHME, UBPHCH, UBALCH, UBPCH, UBNCH, PHBEFF,
     2 PBEFF, ALBEFF, RNBEFF, CBEFF, CCH, ELLIM
      COMMON/FERT/ ELLIM(2), DOSECA(4, 2, 3), DOSEPE(4, 2, 4),
     1 PRICFE(5),
     1 PFERT(2), SLOLI, CONSLI, ALLIME, SLOPHO, CONPHO,
     1 IFERT(10,100)
      COMMON/UTCOM/ LUMAXR(10,100), DAYSBA(10,100), DAYSAC(10,100),
     1 DAYSTC(10,100), DAYSPA(10,100), DAYSFA(10,100),
     2 RAINBA(10,100), RAINAC(10,100)
      COMMON/SOIL/ PHOS(10,100), PH(10,100), AL(10,100),
     1 NITRO(10,100), CARB(10,100), CLAY(10,100), SLOPE(10,100)
      COMMON/BURNS/ BUTYP(10,100), BUQUAL(10,100)
      COMMON/UBCHNG/ UBPHCH, UBALCH, UBPCH, UBNCH
      COMMON/BUCHNG/ PHCH, ALCH, PCH, RNCH
      COMMON/BEFORE/ PHBEFF, ALBEFF, CBEFF, RNBEFF, PBEFF
      EXTERNAL BRAND
C     ASSIGNMENT OF BEFORE FIELD NUTRIENT VALUES
      RNBEFF = NITRO(LOT, IPCH)
      PHBEFF = PH(LOT, IPCH)
      ALBEFF = AL(LOT, IPCH)
      CBEFF = CARB(LOT, IPCH)
      PBEFF = PHOS(LOT, IPCH)
      IF (LUMAXR(LOT, IPCH) .EQ. 5) GO TO 100
C     UNBURNED SOIL CHANGE
      CALL UNBUCH(LOT, IPCH)
C     VIRGIN BURN EFFECTS
      IF (BUTYP(LOT, IPCH) .EQ. 1) CALL VBUEFF(LOT, IPCH)
C     SECOND GROWTH BURN EFFECTS
      IF (BUTYP(LOT, IPCH) .EQ. 2) CALL CBUEFF(LOT, IPCH)
C     WEED BURN EFFECTS
      IF (BUTYP(LOT, IPCH) .EQ. 3) CALL WBUEFF(LOT, IPCH)
      IF (BUTYP(LOT, IPCH) .GE. 1) GO TO 102
      PHCH = UBPHCH
      ALCH = UBALCH
      PCH = UBPCH
      RNCH = UBNCH
      GO TO 102
  100 CONTINUE
C     PASTURE SOILS
      CALL PASTSO(LOT, IPCH)
      GO TO 900
  102 CONTINUE
      PH(LOT, IPCH) = PH(LOT, IPCH) + PHCH
      AL(LOT, IPCH) = AL(LOT, IPCH) + ALCH
      PHOS(LOT, IPCH) = PHOS(LOT, IPCH) + PCH
      NITRO(LOT, IPCH) = NITRO(LOT, IPCH) + RNCH
C     CARBON CHANGE ASSIGNMENT
      CCHME = 4.3151D0 * RNCH -   5.2549D-1 * CARB(LOT, IPCH) +
     1 3.8721D0 * RNBEFF +  1.1566D-1
      CCH = BRAND(2.1106D-1, CCHME)
      CARB(LOT, IPCH) = CARB(LOT, IPCH) + CCH
  900 CONTINUE
      IF (PH(LOT, IPCH) .LE. 3.5) PH(LOT, IPCH) = 3.5
      IF (PH(LOT, IPCH) .GE. 7.6) PH(LOT, IPCH) = 7.6
      IF (CARB(LOT, IPCH) .GE. 5.) CARB(LOT, IPCH) = 5.
```

```
      55.7          IF (NITRO(LOT, IPCH) .GE. 8.) NITRO(LOT, IPCH) = 8.
      55.8          IF (PHOS(LOT, IPCH) .GE. ELLIM(1)) PHOS(LOT, IPCH) = ELLIM(1)
      56            IF (AL(LOT, IPCH) .LT. 0.)  AL(LOT, IPCH) = 0.
      57            IF (PHOS(LOT, IPCH) .LT.1.0) PHOS(LOT, IPCH) = 1.0
      58            IF (NITRO(LOT, IPCH) .LT. 0.) NITRO(LOT, IPCH) = 0.
      59            IF (CARB(LOT, IPCH) .LT. 0.) CARB(LOT, IPCH) = 0.
      60      C     NON-FERTILIZED AND NON-FALLOW ELEMENT LEVELS KEPT WITHIN 95% CONFIDENCE
      61      C     LEVELS FOR RICE SOILS
      62            IF (DAYSTC(LOT, IPCH) .LT. 1.) PHOS(LOT, IPCH) =
      63           1  DMIN1(PHOS(LOT, IPCH), 1.145D1)
      64            IF (DAYSTC(LOT, IPCH) .LT. 1.) PH(LOT, IPCH) =
      65           1  DMIN1(PH(LOT, IPCH), 7.29D0)
      66            IF (LUMAXR(LOT, IPCH) .LE. 5) CARB(LOT, IPCH) =
      67           1 DMIN1(CARB(LOT, IPCH), 1.70D0)
      68            IF (LUMAXR(LOT, IPCH) .LE. 5) NITRO(LOT, IPCH) =
      69           1 DMIN1(NITRO(LOT, IPCH), 6.69D0)
      70            RETURN
      71            END
END OF FILE
```

SQOUT

Purpose:	soil quality output: outputs lists of soil quality measures under different land uses.
Kind of routine:	subroutine
Arguments:	NORUN run number
COMMON areas:	SOIL, SIZES, DATE, UTCOM
Routines called:	none
Routine called by:	MAIN
Output units:	7 = out4 (soil quality output file)
Program size:	2044 bytes

```
      SUBROUTINE SOOUT(NORUN)
C     SOIL QUALITY OUTPUT SUBROUTINE: PRODUCES LISTING OF RESULTS OF
C     AREA-WIDE AVERAGES OF SOIL QUALITY MEASURES FOR LAND IN ANNUAL
C     CROPS OR BARE, IN PASTURE, IN CACAO, OR IN PEPPER
C     AT THE TIME OF MAXIMUM RAINFALL
      DOUBLE PRECISION PH, AL, CARB, NITRO, PHOS, PHSUM, CLAY, SLOPE
      DOUBLE PRECISION ALSUM, CSUM, NSUM, PSUM, PHAVE, ALAVE, CAVE,
     1 NAVE, PAVE, USNO

      DIMENSION PHSUM(4), ALSUM(4), CSUM(4), PHAVE(4), ALAVE(4), CAVE(4)
     1, NAVE(4), NSUM(4), PSUM(4), USNO(4), PAVE(4)
      COMMON/SOIL/ PHOS(10,100), PH(10,100), AL(10,100),
     1 NITRO(10,100), CARB(10,100), CLAY(10,100), SLOPE(10,100)
      COMMON/SIZES/ LOTS, NOPCHS, SIZLOT, SIZPCH
      COMMON/DATE/ IYR
      COMMON/UTCOM/ LUMAXR(10,100), DAYSBA(10,100), DAYSAC(10,100),
     1 DAYSTC(10,100), DAYSPA(10,100), DAYSFA(10,100),
     2 RAINBA(10,100), RAINAC(10,100)
      IF (IYR .EQ. 1) GO TO 202
      IF (IYR .GT. LASTYR) GO TO 202
      GO TO 203
  202 CONTINUE
C     FOR FIRST CALL OF YEAR OR FIRST CALL OF RUN
      DO 204 IU=1,4
      PHSUM(IU) = 0.
      ALSUM(IU) = 0.
      CSUM(IU) = 0.
      NSUM(IU) = 0.
      PSUM(IU) = 0.
      USNO(IU) = 0.
  204 CONTINUE
  203 CONTINUE
      DO 100 I1 = 1, LOTS
      DO 101 I2 = 1,NOPCHS
      IUS = 0
C     FOR ANNUAL OR BARE AT MAXIMUM RAIN
      IF (LUMAXR(I1, I2) .EQ. 2) IUS = 1
C     FOR PASTURE AT MAXIMUM RAIN
      IF (LUMAXR(I1, I2) .EQ. 5) IUS = 2
C     CACAO AT MAXIMUM RAIN
      IF (LUMAXR(I1, I2) .EQ. 4) IUS = 3
C     PEPPER AT MAXIMUM RAIN
      IF (LUMAXR(I1, I2) .EQ. 3) IUS = 4
      IF (IUS .EQ. 0) GO TO 101
      PHSUM(IUS) = PHSUM(IUS) + PH(I1,I2)
      ALSUM(IUS) = ALSUM(IUS) + AL(I1,I2)
      CSUM(IUS) = CSUM(IUS) + CARB(I1,I2)
      NSUM(IUS) = NSUM(IUS) + NITRO(I1,I2)
      PSUM(IUS) = PSUM(IUS) + PHOS(I1,I2)
      USNO(IUS) = USNO(IUS) + 1.
  101 CONTINUE
  100 CONTINUE
      DO 206 I = 1,4
C     MISSING ELEMENT VALUES ASSIGNED VALUE OF -99.
      PHAVE(I) = -99.
      ALAVE(I) = -99.
      CAVE(I) = -99.
      NAVE(I) = -99.
      PAVE(I) = -99.
      IF (USNO(I) .LE. 0.1) GO TO 206
```

```
      PHAVE(I) = PHSUM(I) / USNO(I)
      ALAVE(I) = ALSUM(I) / USNO(I)
      CAVE(I) = CSUM(I) / USNO(I)
      NAVE(I) = NSUM(I) / USNO(I)
      PAVE(I) = PSUM(I) / USNO(I)
  206 CONTINUE
      IF (IYR .EQ. 1) WRITE (7, 1001)
 1001 FORMAT(19X, 'BASE OR ANNUAL CROPS', 9X, '|', 14X,
     1 'PASTURE', 1X, / 'RUN', 2X, 'YR', 5X, 'PH', 8X, 'AL',
     2 5X, 'C', 7X, 'N', 6X, 'P', 7X, 'PH', 6X, 'AL', 6X, 'C',
     3 7X, 'N', 7X, 'P')
      IF (IYR .EQ. 1) WRITE (8, 1002)
 1002 FORMAT(26X, 'CACAO', 17X, '|', 14X,
     1 'PEPPER', 1X, / 'RUN', 2X, 'YR', 5X, 'PH', 8X, 'AL',
     2 5X, 'C', 7X, 'N', 6X, 'P', 7X, 'PH', 6X, 'AL', 6X, 'C',
     3 7X, 'N', 7X, 'P')
      WRITE (7, 1000) NORUN,IYR,(PHAVE(II), ALAVE(II), CAVE(II),
     1 NAVE(II), PAVE(II), II=1,2)
 1000 FORMAT(I3, I5, 10F8.3)
      WRITE (8, 1000) NORUN,IYR,(PHAVE(II), ALAVE(II), CAVE(II),
     1 NAVE(II), PAVE(II), II=3,4)
      LASTYR = IYR
      RETURN
      END
END OF FILE
```

STRAT

Purpose:	strategy of land use allocation: determines land use pattern (LUPAT), colonist type (MORTYP), hunter status (IHUNT), and labor pattern (LABPAT).
Kind of routine:	subroutine
Arguments:	LOT lot number
COMMON areas:	RANDOM, SIZES, COLON, DATE, GAME, WAGELA, CASHPR, DETERM
Routines called:	CASHAL
Routine called by:	LUALLO
Input unit:	14 = bankdata (data file)
Program size:	4938 bytes

```
      SUBROUTINE STRAT(LCT)
C     STRATEGY SUBROUTINE TO DETERMINE COLONIST'S LAND USE STRATEGY
C     (LAND USE PATTERN - LUPAT).  LAND USE PATTERN CODES: 1=ANNUAL CASH
C     CROPS  2="TREE" CROPS  3=RANCHING  4=OUTSIDE LABOR
      DOUBLE PRECISION BRAND
      DIMENSION PROPTY(4, 2), CAPME(4, 2), CAPSD(4, 2), UNMODP(4, 4),
     1 PROBF(4), CGEME(4,2), CGESD(4,2), CGCME(4,2),
     2 CGCSD(4, 2), CGLME(4, 2), CGLSD(4, 2), PR(5)
      COMMON/RANDOM/ INIT
      COMMON/GAME/ SMEAT, IHUNT(10), PHUNT, IENDHU, EFFORT(12), YLDSLO,
     1 YLDINT, EFFSLO, EFFINT, GWASTE
      COMMON/WAGELA/ LABPAT(10), PTYLAB(4, 4), TOLAME(4), TOLASD(4),
     1 RMLAME(4), RMLASD(4), EARNME(4), EARNSD(4), PLEAVE(2, 4)
      COMMON/CASHPR/ PRINME(4), PRINSD(4), PILOME, PILOSD, PRCG(3, 4)
      COMMON/SIZES/ LOTS, NOPCHS, SIZLCT, SIZPCH
      COMMON/COLON/ LUPAT(10), CAPIT(10), CGOODS(10), AREACL(10),
     1 FAMLAB(10), MALES(10), FAMSIZ(10), CGOENT(10), CAPCON(10),
     2 MORTYP(10), IORIG(10), CGOCON(10), CAPENT(10)
      COMMON/DATE/ IYR
      COMMON/DETERM/ ISTCCH
      EXTERNAL ARAND, BRAND
      IF (IYR .GT. 1) GO TO 100
      IF (LCT .GT. 1) GO TO 102
C     FOR FIRST CALL OF RUN
      READ (8, 1000)((PROPTY(MOR, NEW), CAPME(MOR, NEW), CAPSD(MOR,NEW),
     2 CGLME(MOR, NEW), CGLSD(MOR, NEW), CGEME(MOR, NEW),
     3 CGESD(MOR, NEW),CGCME(MOR, NEW), CGCSD(MOR, NEW),
     1 MOR=1,4), NEW=1,2)
 1000 FORMAT(F7.2, 8F7.0)
C     ABOVE FORMAT 1000 FOR FILE STRATDATA: PROPORTION OF MORAN TYPE,
C     MEAN INITIAL CAPITAL, AND INITIAL CAPITAL STANDARD DEVIATION,
C     INITIAL CAPITAL GOODS FOR LOT MEAN AND STD. DEV., INITIAL CAPITAL
C     GOODS FOR ENTERPRISE MEAN AND STD. DEV, AND INITIAL CAPITAL
C     GOODS FOR CONSUMPTION MEAN AND STD. DEV.,
C     WHERE MOR=MORAN TYPE (1=ENTREPRENEUR 2=INDEPENDENT FARMER
C     3=ARTISAN FARMER  4=LABCREP FARMER) AND NEW=NEWCOMER (1=ORIGINAL
C     COLONIST  2=NEWCOMER)
      READ (8, 1001)((UNMODP(IPAT, MORAN), IPAT=1,4), MORAN=1,4)
 1001 FORMAT(4F5.2)
C     ABOVE FORMAT 1001 FOR STRATDATA: UNMODIFIED PROBABILITIES OF
C     COLONIST FOLLOWING EACH LAND USE PATTERN TYPE BASED ON HIS MORAN
C     TYPE (TO BE MODIFIED BY CAPITAL AND AREA CLEARED)
      READ (8,  1005)(PRINME(MOR), PRINSD(MOR), MOR = 1, 4)
 1005 FORMAT(8F5.2)
C     ABOVE FORMAT 1005 FOR FILE "STRATDATA ": PROPORTION OF CAPITAL
C     INVESTED (AFTER SATISFYING SUBSISTENCE CASH NEED) BY MORAN TYPE
      READ (8, 1003)((PTYLAB(LABT, MORT), MORT=1, 4), LABT=1, 4),
     1 (TOLAME(LATY), TOLASD(LATY), RMLAME(LATY), RMLASD(LATY), EARNME(L
     1ATY), EARNSD(LATY), LATY=1, 4), ((PLEAVE(MAR, MOR), MAR=1,2),
     1 MOR=1,4)
 1003 FORMAT(16F5.2,/4F4.0, 2F12.4,/4F4.0, 2F12.4,/4F4.0, 2F12.4,/
     1 4F4.0, 2F12.4, /, 8F6.3)
C     ABOVE FORMAT 1003 FOR FILE "STRATDATA": PROBABILITY OF ENGAGING
C     IN EACH LABOR TYPE BY MORAN TYPE.(LABOR TYPES ARE: 1=DAILY WAGE
C     2=ENTERPRISE 3=GOVERNMENT OR OTHER PROFESSION 4=EARNING WOMEN OR
C     CHILDREN), TOTAL LABOR (MAN-DAYS/LOT/YR) SPENT ON EACH LABOR TYPE,
C     GIVEN THAT THE COLONIST ENGAGES IN THAT LABOR TYPE, STANDARD
C     DEVIATION OF SAME, MALE LABOR MEAN AND STD. DEV. FOR EACH TYPE,
C     EARNINGS: FOR LABOR TYPE 1 THIS IS CR75¢/MAN-DAY (MALE),
C     FOR LABOR TYPE 2 THIS IS THE PROPORTIONAL RETURN ON
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C      INVESTMENT OF BOTH CASH AND CAPITAL GOODS LUMPED-PER YEAR IN
C      CONSTANT CRUZEIROS). FOR OTHER LABOR TYPES THIS
C      IS CR75$/YEAR/LOT EARNED:
C       STD. DEV. OF SAME
       READ (8, 1004) PILOME, PILOSD, ((PROG(ICACAT, MORTP), MORTP=1,4),
      1 ICACAT=1, 3)
 1004 FORMAT(14F5.2)
C      ABOVE FORMAT 1004 FOR FILE "STRATDATA": PROPORTION OF INVESTMENT
C      CAPITAL GOING TO LOT (AS OPPOSED TO ENTERPRISE) DEVELOPMENT GIVEN
C      THAT COLONIST HAS LABOR    PATTERN 2 OR 3, STD. DEV. OF SAME,
C      PROPORTION OF CASH GOING TO PURCHASE OF CAPITAL GOODS FOR EACH
C      CASH CATEGORY AND MORAN TYPE (CASH CATEGORIES: 1=LOT 2=ENTERPRISE
C      3=CONSUMPTION).
       DO 101 I1 = 1, LOTS
       LUPAT(I1) = 0
  101  MORTYP(I1) = 0
       GO TO 102
  104  CONTINUE
C      INITIALIZATIONS FOR NEWCOMER COLONISTS
       CAPIT(LOT) = 0.
       CAPENT(LOT) = 0.
       CGOODS(LOT) = 0.
       CGCENT(LOT) = 0.
       CGOCON(LOT) = 0.
       CAPCON(LOT) = 0.
  102  CONTINUE
C      ASSIGNMENT OF MORAN TYPES
       RMODE = -1.
       IF (ISTOCH .EQ. 2) GO TO 403
C      CALCULATION OF MODE FOR DETERMINISTIC RUNS
       XMAX = 0.
       IMAX = 0
       DO 400 I=1,4
       IF (XMAX .LE. PROPTY(I, IORIG(LOT))) GO TO 401
       GO TO 400
  401  XMAX = PROPTY(I, IORIG(LOT))
       IMAX = I
  400  CONTINUE
       RMODE = 0.
       DO 402 I3=1, IMAX
  402  RMODE = RMODE + PROPTY(I3, IORIG(LOT))
       RMODE = RMODE - 0.0001
  403  CONTINUE
       XRAN = ARAND(INIT, RMODE)
       CUM1 = 0.
       DO 103 I2 = 1, 4
       CUM2 = CUM1 + PROPTY(I2, IORIG(LOT))
       IF (CUM2 .GE. 1.) CUM2 = 1.1
       IF (XRAN .GE. CUM1 .AND. XRAN .LT. CUM2) MORTYP(LOT) = I2
  103  CUM1 = CUM2
       IF(MORTYP(LOT) .NE. 0)GO TO 100
       WRITE (6,3000) LOT
 3000 FORMAT(1X,'ERROR IN MORAN TYPE FOR LOT',I5,2X,'IN STRAT')
       CALL SYSTEM
  100  CONTINUE
C      SELECTION OF NEWCOMERS WITHOUT MORAN TYPE ASSIGNED
       IF (MORTYP(LOT) .EQ. 0) GO TO 104
C      BYPASS FOR TEMPORARY FIXED STRATEGY SOLUTION
       IF(LUPAT(LOT) .GE.1) GO TO 900
C      ASSIGNMENT OF INITIAL CAPITAL
```

```
      CAPIT(LOT) = CAPIT(LOT) + SNGL(BRAND(DBLE(CAPSD(MORTYP(LOT),
     1 IORIG(LOT))),
     1 DBLE(CAPME(MORTYP(LOT),
     1 IORIG(LOT)))))
      CGOODS(LOT) = CGOODS(LOT) + SNGL(BRAND(DBLE(CGLSD(MORTYP(LOT),
     1 IORIG(LOT))),
     1 DBLE(CGLME(MORTYP(LOT),
     1 IORIG(LOT)))))
      CGCENT(LOT) = CGCENT(LOT) + SNGL(BRAND(DBLE(CGESD(MORTYP(LOT),
     1 IORIG(LOT))),
     1 DBLE(CGEME(MORTYP(LOT), IORIG(LOT)))))
      CGOCON(LOT) = CGOCON(LOT) + SNGL(BRAND(DBLE(CGCSD(MORTYP(LOT),
     1 IORIG(LOT))),
     1 DBLE(CGCME(MORTYP(LOT),
     1 IORIG(LOT)))))
      IF (CAPIT(LOT) .LE. 0.) CAPIT(LOT) = 0.
      IF (CGOODS(LOT) .LE. 0.) CGOODS(LOT) = 0.
      IF (CGCENT(LOT) .LE. 0.) CGCENT(LOT) = 0.
      IF (CGOCON(LOT) .LE. 0.) CGOCON(LOT) = 0.
C     CALCULATION OF FINAL PROBABILITY FOR EACH PATTERN BY MORAN TYPE
      DO 200 IPAT = 1, 4
  200 PROBF(IPAT) = UNMODP(IPAT, MORTYP(LOT))
C     ABOVE TEMPORARY SOLUTION USES UNMODIFIED PROBABILITY DIRECTLY
C     ASSIGNMENT OF LAND USE STRATEGY
      RMODE = -1.
      IF (ISTOCH .EQ. 2) GO TO 407
C     ASSIGNMENT OF LAND USE STRATEGY MODE FOR DETERMINISTIC RUNS
      XMAX = 0.
      IMAX = 0
      DO 404 I=1,4
      IF (XMAX .LE. PROBF(I)) GO TO 405
      GO TO 404
  405 XMAX = PROBF(I)
      IMAX = I
  404 CONTINUE
      RMODE = 0.
      DO 406 I4 = 1, IMAX
  406 RMODE = RMODE + PROBF(I4)
      RMODE = RMODE - 0.0001
  407 CONTINUE
      XRAN = ARAND(INIT, RMODE)
      CUM1 = 0.
      DO 202 I=1,4
      CUM2 = CUM1 + PROBF(I)
      IF (CUM2 .GE. 1.) CUM2 = 1.1
      IF (XRAN .GE. CUM1 .AND. XRAN .LT. CUM2) LUPAT(LOT) = I
  202 CUM1 = CUM2
C     HUNTER STATUS ASSIGNED ONLY ONCE
      IF (IHUNT(LOT) .GE. 1) GO TO 800
C     ASSIGNMENT OF HUNTER STATUS (1=HUNTER 2=NOT HUNTER 0=NOT ASSIGNED)
      IHUNT(LOT) = 2
      XRAN = ARAND(INIT, -1.)
      IF (XRAN .LT. PHUNT) IHUNT(LOT) = 1
C     DETERMINATION OF LABOR PAT. BASED ON PROBABILITIES THAT COLONISTS
C     OF EACH MORAN TYPE WILL ENGAGE IN EACH LABOR TYPE
      LAPPAT(LOT) = 0
      IF (ISTOCH .EQ. 2) GO TO 412
C     ASSIGNMENT OF LAPOR PATTERN MODE (INCLUDING ZERO) FOR
C     DETERMINISTIC RUNS
      PTOT = 0.
```

```
      DO 411 I7=1,4
      PR(I7) = PTYLAB(I7, MCRTYP(LOT))
  411 PTOT = PTOT + PR(I7)
      PR(5) = 1. - PTOT
      XMAX = 0.
      IMAX = 0
      DO 408 I5=1,5
      IF (XMAX .LE. PR(I5)) GO TO 409
      GO TO 408
  409 XMAX = PR(I5)
      IMAX = I5
  408 CONTINUE
      RMODE = 0.
      DO 410 I4=1,IMAX
  410 RMODE = RMODE + PR(I4)
      RMODE = RMODE - 0.0001
  412 CONTINUE
      XRAN = ARAND(INIT, RMODE)
      PCUM1 = 0.
      PCUM2 = 0.
      DO 300 LABTY = 1, 4
      PCUM2 = PCUM1 + PTYLAB(LABTY, PORTYP(LOT))
      IF (PCUM2 .GE. 1.) PCUM2 = 1.1
      IF (XRAN .GE. PCUM1 .AND. XRAN .LT. PCUM2) GO TO 301
      PCUM1 = PCUM2
      GO TO 300
  301 CONTINUE
C     FOR COLONISTS ADOPTING A LABOR TYPE (LABTY)
      IF (LABTY .LE. 3) GO TO 304
      IF (LABPAT(LOT) .EQ. 0) GO TO 304
      IF (LABPAT(LOT) .EQ. 1) LABPAT(LOT) = 5
      IF (LABPAT(LOT) .EQ. 2) LABPAT(LOT) = 6
      IF (LABPAT(LOT) .EQ. 3) LABPAT(LOT) = 7
      GO TO 300
  304 LABPAT(LOT) = LABTY
  300 CONTINUE
  800 CONTINUE
C     ALLOCATION OF CASH TO CONSUMPTION, LOT DEVELOPMENT,
C     AND ENTERPRISES
      CALL CASHAL(LOT, CAPIT(LOT))
  900 CONTINUE
      RETURN
      END
END OF FILE
```

SUBSIS

Purpose:	subsistence demand: calculates the hectares of subsistence crops needed to supply subsistence quantities of these crops, including a margin for protection against poor yields.
Kind of routine:	subroutine
Arguments:	LOT lot number IBETYP bean type (land use code for Phaseolus or Vigna) MNTYPE manioc type (land use code for sweet manioc or bitter manioc)
COMMON areas:	COLON, DEMAND, DATE, EXPECT, NEED, SPOIL
Routines called:	none
Routine called by:	LUALLO
Input units:	14 = bankdata (data file)
Program size:	approximately 1100 bytes

```
      SUBROUTINE SUBSIS(LOT, IBETYP, MNTYPE)
C     SUBSISTENCE DEMAND SUBROUTINE: CALCULATES HECTARES OF SUBSISTENCE
C     CROPS NEEDED TO MEET FAMILY SUBSISTENCE DEMAND BASED ON EXPECTED
C     YIELDS.  INCLUDES LEARNING OPTION FOR ADJUSTMENT OF EXPECTED
C     YIELDS.
      DIMENSION EYME(6), EYSD(6)
      COMMON/COLON/ LUPAT(10), CAPIT(10), CGOODS(10), AREACL(10),
     1 FAMLAB(10), MALES(10), FAMSIZ(10), CGOENT(10), CAPCON(10),
     2 MORTYP(10), IORIG(10), CGOCON(10), CAPENT(10)
      COMMON/NEED/SUKGRI, SUKGMZ, SUKGBE, SUKGMN, SUCASH, ZCRISK,
     1 SUKGMT
      COMMON/SPOIL/ ESPOIL(10), SPOIPE(10), SPOISD(10), SPOSME(10),
     1 SPOSSD(10)
      COMMON/DEMAND/ HARI, HAMZ, HABE, HAMN
      COMMON/DATE/ IYR
      COMMON/EXPECT/ EYSUM(6), EYNUM(6), EYSSQ(6)
      IF (IYR .GT. 1 ) GO TO 100
      IF (LOT .GT. 1) GO TO 102
      READ (9, 1000) LEARNS, ZCRISK, (EYME(IC), EYSD(IC), IC=1,6)
 1000 FORMAT(I2, F5.2, 12F5.0)
C     ABOVE FORMAT 1000 FOR SUBSISTDATA.
C     SUBSISTENCE LEARNING CODES: 1=YES  2=NO
C     ZRISK IS Z STATISTIC OF ACCEPTABLE COLONIST RISK OF SUBSISTENCE
C     CROP FAILURE (OF ANY PARTICULAR CROP)
C     EXPECTED YIELD MEAN (EYME) AND EXPECTED YIELD STANDARD DEVIATION
C     (EYSD) (IC=CROPS: 1=RICE  2=MAIZE  3=PHASEOLUS  4=  VIGNA
C     5=BITTER MANIOC  6=SWEET MANIOC
      READ (9, 1001) SUKGRI, SUKGMZ, SUKGBE, SUKGMN, SUKGMT, SUCASH
 1001 FORMAT(6F6.1)
C     ABOVE FORMAT 1001 FOR SUBSISTDATA: SUBSISTENCE NEED OF RICE, MAIZE,
C     BEANS AND MANIOC IN KG/PERSON/YEAR
      DO 101 IC=1, 6
      EYNUM(IC) = 5.
      EYSSQ(IC) = 5. * EYME(IC) * EYME(IC)
  101 EYSUM(IC) = 5. * EYME(IC)
      GO TO 102
  100 CONTINUE
C     BYPASS IF SUBSISTENCE LEARNING FACTOR DISABLED (LEARNS=2)
      IF (LEARNS .EQ. 2) GO TO 102
C     CALCULATION OF EXPECTED MEAN AND STD. DEV. OF YIELD BASED ON PAST
C     EXPERIENCE OF ALL COLONISTS IN AREA
      DO 103 ICROP=1,6
      EYME(ICROP) = EYSUM(ICROP) / EYNUM(ICROP)
      EYSD(ICROP) = SQRT((EYNUM(ICROP) * EYSSQ(ICROP) - EYSUM(ICROP)
     1 * EYSUM(ICROP)) / (EYNUM(ICROP) * (EYNUM(ICROP) - 1.)))
  103 CONTINUE
  102 CONTINUE
C     CALCULATION OF SUBSISTENCE CROP AREA REQUIREMENTS
C     SUBSISTENCE RICE HECTARES
      HARI = (SUKGRI * FAMSIZ(LOT) + ZCRISK * EYSD(1)) *
     1 (ESPOIL(1) + 1.) / EYME(1)
C     SUBSISTENCE MAIZE HECTARES
      HAMZ = (SUKGMZ * FAMSIZ(LOT) + ZCRISK * EYSD(2)) *
     1 (ESPOIL(2) + 1.) / EYME(2)
C     SUBSISTENCE BEAN HECTARES
C     PHASEOLUS (IT=4) - VIGNA (IT=3) DECISION
      IT = 4
      IF (IBETYP .EQ. 10) IT = 3
      HABE = (SUKGBE * FAMSIZ(LOT) + ZCRISK * EYSD(IT)) *
     1  (ESPOIL(IT) + 1.) / EYME(IT)
```

```
      C     SUBSISTENCE MANICC HECTARES
      C     SWEET (IT=6) - BITTER (IT=5) DECISION
            IT = 5
            IF (MNTYPE .EQ. 16) IT = 6
            MANN = (SUBGMN * FAMSIZ(LCT) + ZCRISK * EYSD(IT)) *
           1  (ESPOIL(IT) + 1.) / EYME(IT)
            RETURN
            END
END OF FILE
```

TECHNO

Purpose:	technological improvement: adjusts technological improvement factor for year in accord with assumptions about rates of technological change for the yields of 9 crops.
Type of routine:	subroutine
Arguments:	none
COMMON areas:	DATE, TECHN
Routines called:	none
Routine called by:	MAIN
Input units:.	14 = bankdata (data file)
Program size:	676 bytes

```
      1            SUBROUTINE TECHNO
      2      C     TECHNOLOGICAL IMPROVEMENT SUBROUTINE
      3            DIMENSION IMPEND(9), YRLYIM(9)
      4            COMMON/DATE/ IYR
      5            COMMON/TECHN/ TECH(9), START(9)
      6            IF (IYR .GT. 1) GO TO 101
      7            READ (14, 1000)(START(IC),   IMPEND(IC), YRLYIM(IC),IC=1,9)
      8       1000 FORMAT(15.0, I4, F7.2)
      9      C     ABOVE FORMAT 1000 FOR FILE "DANKDATA"
     10      C     INITIALIZATION OF TECHNOLOGICAL IMPROVEMENT FACTOR
     11            DO 200 ICR = 1,9
     12        200 TECH(ICR) = 1.
     13            GO TO 900
     14        101 CONTINUE
     15            DO 100 IC=1,9
     16            IF (IYR .GE. IMPEND(IC)) GO TO 100
     17            TECH(IC) = (START(IC) + FLOAT(IYR) * YRLYIM(JC)) / START(IC)
     18        100 CONTINUE
     19        900 CONTINUE
     20            RETURN
     21            END
END OF FILE
```

UNBUCH

Purpose:	unburned soil change: calculates changes in soil fertility measures resulting from processes other than burning.
Kind of routine:	subroutine
Arguments:	LOT lot number IPCH patch number
COMMON areas:	UBCHNG, SOIL, UTCOM, USECOM, RANDOM
Routines called:	ARAND, BRAND
Routine called by:	SOILCH
Program size:	1356 bytes

```
      SUBROUTINE UNBUCH(LOT, IPCH)
C     UNBURNED SOIL CHANGE SUBROUTINE
      DOUBLE PRECISION BRAND
      DOUBLE PRECISION PH, PHOS, AL, CLAY, SLOPE, CARB, NITRO, UBPHCH,
     1 UBPCH, UBNCH, PHUBCH, PUBCH, ALUBCH, RNUBCH, UBALCH, PHBEFF
      COMMON/UBCHNG/ UBPHCH, UBALCH, UBPCH, UBNCH
      COMMON/SOIL/ PHOS(10,100), PH(10,100), AL(10,100),
     1 NITRO(10,100), CARB(10,100), CLAY(10,100), SLOPE(10,100)
      COMMON/UTCOM/ LUMAXH(10,100), DAYSBA(10,100), DAYSAC(10,100),
     1 DAYSTC(10,100), DAYSPA(10,100), DAYSFA(10,100),
     2 RAINBA(10,100), RAINAC(10,100)
      COMMON/USECOM/ LOSE(10,100), IDUR(10,100), LASTUS(10,100),
     1 CONTIN(10,100)
      COMMON/RANDOM/ INIT
      EXTERNAL BRAND, ARAND
      PHBEFF = PH(LOT, IPCH)
C     PH UNBURNED CHANGE (PER YEAR) ASSIGNMENT
      PHUBCH=1.8594D0 - 4.1866D-1 * PH(LOT, IPCH)
      UBPHCH = BRAND(8.4175D-1, PHUBCH)
C     ALUMINUM UNBURNED CHANGE (PER YEAR) ASSIGNMENT
      ALUBCH = 4.851bD-6 - 1.5033D-5 * AL(LOT, IPCH)
     1  - 1.5317D-4 * UBPHCH
      UBALCH = BRAND(1.4465D-4, ALUBCH)
C     PHOSPHORUS UNBURNED CHANGE (PER YEAR) ASSIGNMENT
      IF (PHOS(LOT, IPCH) .LT. 1.01) GO TO 100
      IF (PHOS(LOT, IPCH) .LT. 10.01) GO TO 101
C     CASE OF BEFORE FIELD PHOSPHORUS GREATER THAN OR EQUAL TO 10 PPM
      PUBCH = 6.8086D0 - 1.4363D0* PHOS(LOT, IPCH)
      UBPCH = BRAND(6.583D0, PUBCH)
      GO TO 102
  100 CONTINUE
C     CASE OF BEFORE FIELD PHOSPHORUS LESS THAN OR EQUAL TO 1 PPM
      XRAN = ARAND(INIT, -1.)
      UBPCH = 0.
C     PROBABILITY OF NO CHANGE IN PHOSPHORUS
      IF (XRAN .LT. 0.648) GO TO 102
C     CASE OF PHOSPHORUS CHANGES GREATER THAN ZERO
      PUBCH = 1.4143D0 * PHBEFF - 3.4733D0
      UBPCH = BRAND(1.9841D0, PUBCH)
      GO TO 102
  101 CONTINUE
C     CASE OF BEFORE FIELD PHOSPHORUS IN 2 - 5 PPM RANGE
      PUBCH = 9.7151D-1 * UBPHCH - 1.0405D0 * PHOS(LOT, IPCH) +
     1 2.2395D-2 * ((DAYSBA(LOT, IPCH) + DAYSAC(LOT, IPCH)) / 365.25)
     2 + 2.167D0
      UBPCH = BRAND(2.5049D0, PUBCH)
C     NITROGEN UNBURNED CHANGE ASSIGNMENT
  102 RNUBCH = 9.16D-2 * CARB(LOT, IPCH) - 0.771 * NITRO(LOT, IPCH)
     1 - 3.68D-5 * DAYSAC(LOT, IPCH) + 1.30D-2 * PHBEFF + 4.18D-5
     2 * DBLE(DAYSFA(LOT, IPCH)) - 7.04D-2
      UBNCH = BRAND(3.61D-2, RNUBCH)
      RETURN
      END
END OF FILE
```

USECNT

Purpose:	land use counters: tallys areas and yields for land use output
Kind of routine:	subroutine
Arguments:	LUOCRO land use output crop code (see "LUOUT land use codes" in codes section)
	YLD yield (kg/ha)
COMMON areas:	LUOUT
Routines called:	none
Routine called by:	LOTPRO
Program size:	approximately 200 bytes

```
      1            SUBROUTINE USECNT(LUOCRC, YLD)
      2      C     LAND USE COUNT SUBROUTINE
      3            COMMON/LUOUT/USEOUT(3, 12), LOTUSE(12)
      4            USEOUT(1, LUOCRO) = USEOUT(1, LUOCRO) + 1.
      5            IF (LOTUSE(LUOCRO) .LE. 0) USEOUT(2, LUOCRO) = USEOUT(2, LUOCRO) +
      6           1  1.
      7            LOTUSE(LUOCRO) = 1
      8            USEOUT(3, LUOCRO) = USEOUT(3, LUOCRO) + YLD
      9            RETURN
     10            END
END OF FILE
```

USETOT

Purpose:	land use totals: computes days in each land use category.
Kind of routine:	subroutine
Arguments:	LOT lot number
	IPCH patch number
	JPVLU previous land use (land use code referring to the whole year for the previous agricultural year) (see codes section for "land use codes")
	IP call number for the lot and year
COMMON areas:	UTCOM, DATE, USECOM
Routines called:	MAXRA, IDAGYR, BRAND
Routine called by:	LUALLO
Program size:	6464 bytes

```
      SUBROUTINE USETOT(LOT, IPCH, IPVLU, IP)
C     LAND USE TOTALS SUBROUTINE: COMPUTES DAYS SPENT IN EACH LAND USE
C     CATEGORY FOR USE IN CALCULATING SOIL CHANGES
      DOUBLE PRECISION BRAND
      DIMENSION ITEM(366)
      COMMON/UTCOM/ LUMAXR(10,100), DAYSBA(10,100), DAYSAC(10,100),
     1 DAYSTC(10,100), DAYSPA(10,100), DAYSFA(10,100),
     2 RAINBA(10,100), RAINAC(10,100)
      COMMON/DATE/ IYR
      COMMON/USECOM/ LUSE(10,100), IDUR(10,100), LASTUS(10,100),
     1 CONTIN(10,100)
      EXTERNAL MAXRA, IDAGYR, BRAND
      IF (LOT .EQ. 1 .AND. IP .EQ. 1)MRAIND = MAXRA(IYR)
C     INITIALIZES ALL ITEMS AS "NO CATEGORY"
      DO 101 I2 = 1, 366
  101 ITEM(I2) = 1
      DAYSBA(LOT, IPCH) = 0.
      DAYSAC(LOT, IPCH) = 0.
      DAYSTC(LOT, IPCH) = 0.
      DAYSPA(LOT, IPCH) = 0.
      DAYSPA(LOT, IPCH) = 0.
      RAINBA(LOT, IPCH) = 0.
      RAINAC(LOT, IPCH) = 0.
C     CODES FOR "ITEMS", "LASTUS" AND "LU" (DIFFERENT FROM "LUSE" CODES
C     AND "LUMAXR" CODES) : 1=NO CATEGORY 2=BARE 3=ANNUAL CROPS 4="TREE"
C     CROPS  5=PASTURE  6=FALLOW (WEEDS OR SECOND GROWTH)
      ITEM(1) = LASTUS(LOT, IPCH)
      IF (LASTUS(LOT, IPCH) .EQ. 3) GO TO 400
      IF (LASTUS(LOT, IPCH) .EQ. 2) ITEM(60 - IDUR(LOT, IPCH)) = 6
      GO TO 401
  400 CONTINUE
C     FIELDS IN ANNUAL CROPS AT END OF LAST YEAR (AGRIC. YEAR) HARVESTING
      IF (IPVLU .GE. 12 .AND. IPVLU .LE. 15) GO TO 403
      IF (IPVLU .EQ. 16 .OR. IPVLU .EQ. 17) GO TO 404
      IF (IPVLU .EQ. 22 .OR. IPVLU .EQ. 24) GO TO 404
C     FOR PHASEOLUS COMBINATIONS
      IF (IPVLU .EQ. 8 .OR. IPVLU .EQ. 9) ITEM(IDAGYR(15, 8)) = 2
      GO TO 401
  403 CONTINUE
C     FOR BITTER MANIOC COMBINATIONS
      IGROW = IFIX(SNGL(BRAND(1.93D2, 4.72D2)))
  405 IF (IGROW .LE. IDUR(LOT, IPCH)) IGROW = IDUR(LOT, IPCH)
      IF (IGROW .GE. (IDUR(LOT, IPCH) + 365)) GO TO 501
      ITEM(IGROW - IDUR(LOT, IPCH) + 1) = 2
      GO TO 401
  404 CONTINUE
C     FOR SWEET MANIOC COMBINATIONS
      IGROW = IFIX(SNGL(BRAND(1.03D2, 4.71D2)))
      GO TO 405
  401 CONTINUE
C     PLANTING AND HARVESTING EVENTS FOR PRESENT AGRICULTURAL YEAR'S
C     CROP ACCORDING TO PRESENT YEAR'S LAND USE CODE
      LANDU = LUSE(LOT, IPCH)
      GO TO(1, 2, 2, 2, 5, 6, 7, 8, 9, 10, 11, 12, 12, 12, 12, 12, 12,
     1 18, 19, 20, 21, 12, 18, 12), LANDU
      WRITE(6, 1000) LUSE(LOT, IPCH)
 1000 FORMAT(1X, 'ERROR: LAND USE CODE', I5, 2X,
     1 'NOT RECOGNIZED IN USETOT')
      CALL SYSTEM
    1 CONTINUE
```

```
      C     FOR VIRGIN (USE=1)
            LUMAIR(LOT, IPCH) = 1
            GO TO 500
          2 CONTINUE
      C     FOR BARE, WEEDS OR SECOND GROWTH (USES 2, 3 OR 4)
            IF (LASTUS(LOT, IPCH) .NE. 2) ITEM(1) = 6
            GO TO 501
          5 CONTINUE
      C     FOR RICE ALONE (USE=5)
            ITEM(IDAGYR(15, 9)) = 2
            ITEM(IDAGYR(15, 1)) = 3
            ITEM(IDAGYR(1, 6)) = 2
            GO TO 501
          6 CONTINUE
      C     FOR RICE WITH MAIZE (USE=6)
            ITEM(IDAGYR(15, 9)) = 2
            ITEM(IDAGYR(15,12)) = 3
            ITEM(IDAGYR(1, 6)) = 2
            GO TO 501
          7 CONTINUE
      C     FOR MAIZE ALONE (USE=7)
            ITEM(IDAGYR(15, 9)) = 2
            ITEM(IDAGYR(15,12)) = 3
            ITEM(IDAGYR(15, 3)) = 2
            ITEM(IDAGYR(15, 5)) = 6
            GO TO 501
          8 CONTINUE
      C     FOR PHASEOLUS (USE=8)
            ITEM(IDAGYR(15, 9)) = 2
            ITEM(IDAGYR(15,11)) = 6
            ITEM(IDAGYR(15, 5)) = 3
            GO TO 501
          9 CONTINUE
      C     FOR PHASEOLUS AND GREEN MAIZE (USE=9)
            ITEM(IDAGYR(15, 9)) = 2
            ITEM(IDAGYR(15,12)) = 3
            GO TO 501
         10 CONTINUE
      C     FOR VIGNA (USE=10)
            ITEM(IDAGYR(15, 9)) = 2
            ITEM(IDAGYR(15,11)) = 6
            ITEM(IDAGYR(15, 4)) = 3
            GO TO 501
         11 CONTINUE
      C     FOR VIGNA AND GREEN MAIZE (USE=11)
            ITEM(IDAGYR(15, 9)) = 2
            ITEM(IDAGYR(15,12)) = 3
            GO TO 501
         12 CONTINUE
      C     FOR BITTER MANIOC (USE=12), RICE + BN (USE=13), MAIZE+BN(USE=14),
      C     RI-MZ-BN(USE=15), SWEET MANIOC(USE=16), RI-SN(USE=22) AND SN-MZ
      C     (USE=24)
            IF (IPVLU .GE. 12 .AND. IPVLU .LE. 17) GO TO 501
            IF (IPVLU .EQ. 22 .OR. IPVLU .EQ. 24) GO TO 501
            ITEM(IDAGYR(15, 9)) = 2
            ITEM(IDAGYR(1, 1)) = 3
            GO TO 501 .
         18 CONTINUE
      C     FOR PASTURE WITH ANIMALS (USE=23) AND PASTURE WITHOUT ANIMALS
      C     (USE=18)
```

```
121           ITEM(1) = 5
122           GO TO 501
123        19 CONTINUE
124     C     FOR RICE WITH PASTURE (USE=19)
125           ITEM(IDAGYR(15, 9)) = 2
126           ITEM(IDAGYR(15, 1)) = 3
127           ITEM(IDAGYR(15, 6)) = 5
128           GO TO 501
129        20 CONTINUE
130     C     FOR CACAO (USE=20)
131           IF (IPVLU .EQ. 20) GO TO 501
132           ITEM(IDAGYR(15, 9)) = 2
133           ITEM(IDAGYR(15, 1)) = 4
134           GO TO 501
135        21 CONTINUE
136     C     FOR PEPPER (USE=21)
137           IF (IPVLU .EQ. 21) GO TO 501
138           ITEM(IDAGYR(15, 9)) = 2
139           ITEM(IDAGYR(15, 1)) = 4
140       501 CONTINUE
141           LU = LASTUS(LOT, IPCH)
142           NODIYR = 365
143           IF (MOD(IYR, 4) .EQ. 0) NODIYR = 366
144           DO 102 ID= 1, NODIYR
145     C     SAVE PREVIOUS "LU" (LAST ITEM CHANGE)
146           LUPREV = LU
147           IF (ITEM(ID) .GE. 2) LU = ITEM(ID)
148     C     IDUR RESET TO ZERO IF PATCH IS BARE EVEN FOR A DAY
149           IF (LU .NE. LUPREV) IDUR(LOT, IPCH) = 0
150           IDUR(LOT, IPCH) = IDUR(LOT, IPCH) + 1
151     C     UPDATING OF CONTINUOUS CULTIVATION DAY COUNTER FOR PATCH.  NOTE THAT
152     C     "CULTIVATION" INCLUDES BARE, WEEDS AND PASTURE AS WELL AS ANNUAL AND
153     C     PERENNIAL CROPS.  "CONTIN" WILL BE UPDATED TO LAST DAY OF THE AGRIC.
154     C     YEAR.
155           IF (LU .EQ. 1)  GO TO 650
156           IF (LU .GE. 2 .AND. LU .LE. 5) GO TO 651
157     C     WEEDS (AGE < 240 DAYS) INCLUDED AS "CULTIVATED"
158     C     FOR CONTIN
159           IF (IDUR(LOT, IPCH) .GE. 240) GO TO 650
160       651 CONTIN(LOT, IPCH) = CONTIN(LOT, IPCH) + 1.
161           GO TO 652
162       650 CONTIN(LOT, IPCH) = 0.
163       652 CONTINUE
164     C     BARE - WEEDS DEFAULT TRANSITION
165           IF (LU .EQ. 2 .AND. IDUR(LOT, IPCH) .GE. 60) LU = 6
166           IF (ID .EQ. MRAIND) GO TO 103
167           IF (LU.EQ. 1) GO TO 102
168           GO TO 104
169       103 CONTINUE
170     C     ASSIGNMENT OF LAND USE AT TIME OF MAXIMUM RAINFALL IN 24 HOURS
171     C     "LUMAXR" CODES (DIFFERENT FROM BOTH "LUSE" CODES AND "ITEM" CODES)
172     C     ARE: 1=VIRGIN  2=ANNUAL OR BARE  3=PEPPER  4=CACAO  5=PASTURE
173     C     6=WEEDS  7=SECOND GROWTH
174           IF (LU .EQ. 1) LUMAXR(LOT, IPCH) = 1
175           IF (LU .EQ. 2) LUMAXR(LOT, IPCH) = 2
176           IF (LU .EQ. 3) LUMAXR(LOT, IPCH) = 2
177           IF (LU .EQ. 4 .AND.LUSE(LOT,IPCH).EQ.20) LUMAXR(LOT,IPCH)=4
178           IF (LU .EQ. 4 .AND.LUSE(LOT,IPCH).EQ.21) LUMAXR(LOT,IPCH)=3
179           IF (LU .EQ. 5) LUMAXR(LOT, IPCH) = 5
180           IF (LU .EQ. 6) LUMAXR(LOT, IPCH) = 6
```

```
      181            IF (LU .EQ. 6 .AND. IDUR(LOT,IPCH) .GE. 240)LUMAXB(LOT,IPCH)
      182           1 = 7
      183          104 CONTINUE
      184              GO TO(102, 600, 601, 602, 603, 604), LU
      185              WRITE (6, 2000) LU
      186         2000 FORMAT(1X, 'ERROR: LAND USE ITEM CODE (UTCOM CODE)', I4, 2X,
      187             1 'NOT RECOGNIZED IN USETOT')
      188              CALL SYSTEM
      189          600 CONTINUE
      190              DAYSBA(LOT, IPCH) = DAYSBA(LOT, IPCH) + 1.
      191              GO TO 102
      192          601 DAYSAC(LOT, IPCH) = DAYSAC(LOT, IPCH) + 1.
      193              GO TO 102
      194          602 DAYSTC(LOT, IPCH) = DAYSTC(LOT, IPCH) + 1.
      195              GO TO 102
      196          603 DAYSPA(LOT, IPCH) = DAYSPA(LOT, IPCH) + 1.
      197              GO TO 102
      198          604 DAYSFA(LOT, IPCH) = DAYSFA(LOT, IPCH) + 1.
      199          102 CONTINUE
      200      C       SAVING OF "UTCOM CODE" OR "ITEM CODE" OF LAST DAY OF AGRIC. YEAR
      201              LASTUS(LOT, IPCH) = LU
      202          500 CONTINUE
      203              RETURN
      204              END
END OF FILE
```

VBQ

Purpose:	virgin burn quality: predicts burn quality from weather information.
Kind of routine:	subroutine
Arguments:	LOT lot number
	IPCH patch number
COMMON areas	DATE, RANDOM, BURNS, WEATOT, BQCALL
Routines called:	WEABD, IDAGYR, ARAND, BRAND
Routine called by:	ALLOC
Program size:	1878 bytes

```
      SUBROUTINE VBQ(LOT, IPCH)
C     VIRGIN BURN QUALITY SUBROUTINE
      INTEGER BUQUAL, BUTYP
      DOUBLE PRECISION BRAND
      COMMON/DATE/ IYR
      COMMON/BQCALL/ LLOTV, LYRV, LLOTSG, LYRSG, LLOTW, LYRW
      COMMON/RANDOM/ INIT
      COMMON/BURNS/ BUTYP(10,100), BUQUAL(10,100)
      COMMON/WEATOT/ RAINSU, EVAPSU, RINSSU
      EXTERNAL IDAGYR, ARAND, BRAND
C     FOLLOWING ASSIGNS ONLY THE BURN QUALITY OF THE FIRST PATCH BURNED
C     FOR A GIVEN LOT IN A GIVEN YEAR TO ALL VIRGIN PATCHES BURNED IN
      IF (IYR .NE. LYRV) GO TO 200
      IF (LOT .EQ. LLOTV) GO TO 201
      LLOTV = LOT
      GO TO 200
  201 BUQUAL(LOT, IPCH) = LSTVBQ
      GO TO 102
  200 CONTINUE
      LLOTV = LOT
C     ASSIGNMENT OF CALENDAR MONTH OF FELLING
      XRAN = ARAND(INIT, -1.)
      IF (XRAN .LT. 0.003) MOFELL = 5
      IF (XRAN .GE. 0.003 .AND. XRAN .LT. 0.009) MOFELL = 6
      IF (XRAN .GE. 0.009 .AND. XRAN .LT. 0.053) MOFELL = 7
      IF (XRAN .GE. 0.053 .AND. XRAN .LT. 0.138) MOFELL = 8
      IF (XRAN .GE. 0.138 .AND. XRAN .LT. 0.633) MOFELL = 9
      IF (XRAN .GE. 0.633 .AND. XRAN .LT. 0.859) MOFELL = 10
      IF (XRAN .GE. 0.859 .AND. XRAN .LT. 0.961) MOFELL = 11
      IF (XRAN .GE. 0.961) MOFELL = 12
      XRAN = ARAND(INIT, -1.)
      IFELDM = INT(XRAN * 30.)
      IFELDY = IDAGYR(IFELDM, MOFELL)
C     ASSIGNMENT OF DAYS BETWEEN FELLING AND BURNING
      DBFB = SNGL(BRAND(5.5D1, 4.4D1))
      IDBFB = IFIX(DBFB)
      IF (IDBFB .LT. 1) IDBFB = 1
C     CALCULATION OF BURNING DAY OF YEAR
      IBUDYR = IFELDY + IDBFB
C     CALCULATION OF WEATHER BETWEEN FELLING AND BURNING
      CALL WEABD(IFELDY, IBUDYR)
      RAINFB = RAINSU
      EVAPFB = EVAPSU
      RINSFB = RINSSU
C     CALCULATION OF WEATHER IN FIFTEEN DAYS PRIOR TO BURN
      I15DPB= IBUDYR - 15
      CALL WEABD(I15DPB, IBUDYR)
      RAIN15 = RAINSU
      EVAP15 = EVAPSU
      RINS15 = RINSSU
C     CALCULATION OF GOOD BURN DISCRIMINANT FUNCTION
      GOOD = 1.27E-3 * RAINFB - 5.27E-5 * EVAPFB + 2.58E-2 * RINSFB
     1 + 8.86E-2 * RAIN15 + 0.183 * EVAP15 + 3.16E-2 * RINS15 - 7.575
C     CALCULATION OF BAD BURN DISCRIMINANT FUNCTION
      BAD = 3.25E-3 * RAINFB - 3.59E-3 * EVAPFB + 3.49E-3 * RINSFB
     1 + 7.69E-2 * RAIN15 + 0.158 * EVAP15 + 3.84 * RINS15 - 6.162
C     BURN QUALITY DECISION
      IF (GOOD .GT. BAD) GO TO 100
      GO TO 101
  100 CONTINUE
```

```
      C     FOR CASES WITH GOOD BURN PREDICTED BY DISCRIMINANT FUNCTION
            XRAN = ARAND(INIT, -1.)
            BUQUAL(LOT, IPCH) = 1
            IF (XRAN .LT. 0.734) BUQUAL(LOT, IPCH) = 2
            GO TO 102
        101 CONTINUE
      C     FOR CASES WITH BAD BURN PREDICTED BY DISCRIMINANT FUNCTION
            XRAN = ARAND(INIT, -1.)
            BUQUAL(LOT, IPCH) = 1
            IF (XRAN .LT. 0.167) BUQUAL(LOT, IPCH) = 2
        102 CONTINUE
            LSTVBQ = BUQUAL(LOT, IPCH)
      C     LAST YEAR INDICATOR FOR VIRGIN BURN SET
            LYRV = IYR
            BUTYP(LOT, IPCH) = 1
            RETURN
            END
END OF FILE
```

VBUEFF

Purpose:	virgin burn effects: changes in soil nutrient levels resulting from virgin burns of different qualities.
Kind of routine:	subroutine
Arguments:	LOT lot number IPCH patch number
COMMON areas:	BUCHNG, SOIL, EROCOM, BURNS, UBCHNG, BEFORE
Routines called:	BRAND
Routine called by:	SOILCH
Program size:	1156 bytes

```
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0001                  SUBROUTINE VBUEFF(LOT, IPCH)                                          1.000
                C     VIRGIN BURN EFFECTS SUBROUTINE                                        2.000
0002                  INTEGER BUQUAL, BUTYP                                                 3.000
0003                  DOUBLE PRECISION BRAND                                                4.000
0004                  DOUBLE PRECISION PHOS, PH, AL, NITRO, CARB, CLAY, SLOPE, PHCH,        5.000
                     1 ALCH, PCH, RNCH, UBPHCH, UBALCH, UBPCH, UBNCH, PCHME, RNCHME,        6.000
                     2 PHCHME, ALCHME, VBODUM, PHBEFF, ALBEFF, CBEFF, RNBEFF, PBEFF         7.000
0005                  COMMON/BUCHNG/ PHCH, ALCH, PCH, RNCH                                  8.000
0006                  COMMON/SOIL/ PHOS(10,100), PH(10,100), AL(10,100),                    9.000
                     1 NITRO(10,100), CARB(10,100), CLAY(10,100), SLOPE(10,100)           10.000
0007                  COMMON/EROCOM/ EROS                                                  11.000
0008                  COMMON/BURNS/ BUTYP(10,100), BUQUAL(10,100)                          12.000
0009                  COMMON/UBCHNG/ UBPHCH, UBALCH, UBPCH, UBNCH                          13.000
0010                  COMMON/BEFORE/ PHBEFF, ALBEFF, CBEFF, RNBEFF, PBEFF                  14.000
0011                  EXTERNAL BRAND                                                       15.000
                C     VIRGIN BURN QUALITY DUMMY VARIABLE ASSIGNMENT                        16.000
0012                  VBODUM = -1.                                                         17.000
0013                  IF (BUQUAL(LOT, IPCH) .LE. 1) VBODUM = 1.                            18.000
                C     PHOSPHORUS CHANGE CALCULATION                                        19.000
0014                  PCHME = 0.677 * UBPCH - 0.257 * VBODUM - 0.778                       20.000
0015                  PCH = BRAND(3.25D0, PCHME)                                           21.000
                C     NITROGEN CHANGE CALCULATION                                          22.000
0016                  RNCHME = 4.89D-2 * CBEFF - 0.654 * RNBEFF + 2.63D-2 * PHBEFF         23.000
                     1 - 5.80D-2                                                          24.000
0017                  RNCH = BRAND(5.88D-2, RNCHME)                                        25.000
                C     PH CHANGE CALCULATION                                                26.000
0018                  IF (PHBEFF .LT. 4.) GO TO 110                                        27.000
0019                  IF (PHBEFF .GE. 4. .AND. PHBEFF .LT. 5.) GO TO 111                   28.000
0020                  GO TO 112                                                            29.000
0021                110 CONTINUE                                                           30.000
                C     FOR BEFORE FIELD PH LESS THAN 4.0                                    31.000
0022                  PHCHME = 1.54 - 2.30 * ALBEFF - 0.266 * VBODUM                       32.000
0023                  PHCH = BRAND(6.09D-1, PHCHME)                                        33.000
0024                  GO TO 113                                                            34.000
0025                111 CONTINUE                                                           35.000
                C     FOR BEFORE FIELD PH 4.0 - 4.9                                        36.000
0026                  PHCHME = 1.99 - 3.11D-2 * CLAY(LOT, IPCH) - 6.68D-2 * EROS           37.000
0027                  PHCH = BRAND(7.14D-1, PHCHME)                                        38.000
0028                  GO TO 113                                                            39.000
0029                112 CONTINUE                                                           40.000
                C     FOR BEFORE FIELD PH 5.0 OR GREATER                                   41.000
0030                  PHCHME = 5.21 - 0.180 * VBODUM                                       42.000
0031                  PHCH = BRAND(7.17D-1, PHCHME)                                        43.000
0032                113 CONTINUE                                                           44.000
                C     ALUMINUM CHANGE CALCULATION                                          45.000
0033                  ALCHME = 0.295 - 0.222 * ALBEFF + 0.224 * VBODUM                     46.000
0034                  ALCH = BRAND(1.49D0, ALCHME)                                         47.000
0035                  RETURN                                                               48.000
0036                  END                                                                  49.000
 *OPTIONS IN EFFECT*   ID,EBCDIC,SOURCE,NOLIST,NODECK,LOAD,NOMAP
 *OPTIONS IN EFFECT*   NAME = VBUEFF   , LINECNT =      57
 *STATISTICS*     SOURCE STATEMENTS =      36,PROGRAM SIZE =     1192
 *STATISTICS*   NO DIAGNOSTICS GENERATED

NO STATEMENTS FLAGGED IN THE ABOVE COMPILATIONS.
```

VIYLD

Purpose:	Vigna yield
Kind of routine:	subroutine
Arguments:	LOT lot number
	IPCH patch number
COMMON areas:	SOIL, USECOM, RANDOM, YIELDS, TECHN
Routines called:	ARAND, BRAND
Routine called by:	LOTPRO
Program size:	986 bytes

```
      1            SUBROUTINE VIYLD(LOT, IPCH)
      2      C     VIGNA YIELD SUBROUTINE
      3            DOUBLE PRECISION BRAND
      4            DOUBLE PRECISION PHOS, PH, AL, NITRO, CARB, CLAY, SLOPE,
      5           1 PRYLME, PRYL, PHADJ, VBLTYD
      6            COMMON/SOIL/ PHOS(10,100), PH(10,100), AL(10,100),
      7           1 NITRO(10,100), CARB(10,100), CLAY(10,100), SLOPE(10,100)
      8            COMMON/TECHN/ TECH(9), START(9)
      9            COMMON/USECOM/ LUSE(10,100), IDUR(10,100), LASTUS(10,100),
     10           1 CONTIN(10,100)
     11            COMMON/RANDOM/ INIT
     12            COMMON/YIELDS/ YLDBI, YLDMZ, YLDPS, YLDVI, YLDBM, YLDSM, YLDPE,
     13           1 YLDCA, YLDPA
     14            COMMON/YLDCAL/ ICRCAL(11)
     15            EXTERNAL ARAND, BRAND
     16            IF (ICRCAL(9) .GE. 1) GO TO 100
     17      C     FOR FIRST CALL FOR LOT AND YEAR
     18            ICRCAL(9) = 1
     19      C     INITIALIZATION OF DISEASE AND RABBITS MULTIPLIERS
     20            DISMUL = 1.0
     21            RABMUL = 1.0
     22      C     SEED PLANTING DENSITY (KG SEEDS / HA) ASSIGNMENT
     23            SEEDDE = SNGL(BRAND(7.82D0, 8.10D0))
     24            PHADJ = PH(LOT, IPCH)
     25            IF(PHADJ .GE. 6.0) PHADJ = 6.0
     26            IF (SEEDDE .LE. 0.) SEEDDE = 0.
     27      C     CALCULATION OF REGRESSION PREDICTED YIELD (KG / KG SEED SOWN)
     28            PRYLME = 20.81 * PHADJ - 84.40
     29            PRYL = BRAND(1.39D1, PRYLME)
     30            VBLTYD = PRYL - PRYLME
     31      C     DISEASE DECISION
     32            XRAN = ARAND(INIT, -1.)
     33            IF (XRAN .LT. 0.143) DISMUL = 0.09
     34      C     SEVERE RABBIT ATTACK (INTENSITY 3 OR 4) DECISION
     35            XRAN = ARAND(INIT, -1.)
     36            IF (XRAN .LT. 0.176) RABMUL = 0.68
     37        100 CONTINUE
     38            PHADJ = PH(LOT, IPCH)
     39            IF(PHADJ .GE. 6.0) PHADJ = 6.0
     40            IF (SEEDDE .LE. 0.) SEEDDE = 0.
     41      C     CALCULATION OF REGRESSION PREDICTED YIELD (KG / KG SEED SOWN)
     42            PRYLME = 20.81 * PHADJ - 84.40
     43      C     VIGNA YIELD CALCULATION (KG / HA)
     44            PRYL = PRYLME + VBLTYD
     45            IF (PRYL .LE. 0.) PRYL = 0.
     46            YLDVI = PRYL * SEEDDE * DISMUL * RABMUL
     47      C     ADJUSTMENT FOR TECHNOLOGICAL IMPROVEMENT
     48            YLDVI = YLDVI * TECH(4)
     49            IF (YLDVI .LT. 0.0) YLDVI = 0.0
     50            RETURN
     51            END
END OF FILE
```

WAGE

Purpose:	outside wage and other labor: determines days spent in outside labor and adjusts total labor, male labor, and cash totals accordingly.
Kind of routine:	subroutine
Arguments:	LOT lot number
COMMON areas:	COLON, FLAB, WAGELA, CASHPR
Routines called:	BRAND
Routine called by:	LUALLO
Program size:	1200 bytes

```
      SUBROUTINE WAGE(LOT)
C     WAGE AND OTHER OUTSIDE LABOR SUBROUTINE.  DETERMINES DAYS SPENT
      DOUBLE PRECISION BRAND
C     AND ADJUSTS TOTAL LABOR, MALE LABOR AND CASH TOTALS ACCORDINGLY.
      COMMON/COLON/ LUPAT(10), CAPIT(10), CGOODS(10), AREACL(10),
     1 FAMLAB(10), MALES(10), FAMSIZ(10), CGOENT(10), CAPCON(10),
     2 MORTYP(10), IORIG(10),CGOCON(10), CAPENT(10)
      COMMON/FLAB/ FLTOT(12), FLMALE(12), LABCAL
      COMMON/WAGELA/ LABPAT(10), PTYLAB(4, 4), TOLAME(4), TOLASD(4),
     1 RMLAME(4), RMLASD(4), EARNME(4), EARNSD(4), PLEAVE(2, 4)
      COMMON/CASHPR/PRINME(4),PRINSD(4),
     1 PILOME,PILOSD,PRCG(3, 4)
      EXTERNAL BRAND
C     INITIALIZATION OF MALE LABOR FOR YEAR
C     LABOR ADJUSTED FOR 52 SUNDAYS
      RMALEL = FLOAT(MALES(LOT))
      CASH = 0.
      IF (LABPAT(LOT) .EQ. 0) GO TO 106
      IF (LABPAT(LOT) .EQ. 4) GO TO 101
      LABTY = 4
      GO TO 102
  101 LABTY = LABPAT(LOT)
  102 CONTINUE
C     ADJUSTMENT OF TOTAL LABOR
C     LABOR TYPE (LABTY) CODES: 0=NONE 1=DAILY WAGE 2=ENTERPRISE (STORES
C      ETC.), 3=GOVERNMENT PROFESSION  4=WOMEN OR CHILDREN EARNINGS
      FAMLAB(LOT) = FAMLAB(LOT)  - SNGL(BRAND(DBLE(TOLASD(LABTY)),
     1 DBLE(TOLAME(LABTY))))
C     ADJUSTMENT OF MALE LABOR
      RMALEU = SNGL(BRAND(DBLE(RMLASD(LABTY)), DBLE(RMLAME(LABTY))))
      RMALEL = RMALEL - RMALEU
      IF (LABTY .EQ. 2) GO TO 103
      IF (LABTY .EQ. 1) GO TO 104
C     FOR GOVERNMENT WORKERS AND EARNING WOMEN OR CHILDREN
      CASH = CASH + SNGL(BRAND(DBLE(EARNSD(LABTY)),
     1 DBLE(EARNME(LABTY))))
      GO TO 100
  103 CONTINUE
C     FOR ENTERPRISES
      CASH = CASH + (CAPENT(LOT) + CGOENT(LOT)) *
     1 SNGL(BRAND(DBLE(EARNSD(2)),
     1 DBLE(EARNME(2))))
      GO TO 100
  104 CONTINUE
C     FOR DAILY LABORERS
      CASH = CASH + RMALEU
     1 *  SNGL(BRAND(DBLE(EARNSD(1)), DBLE(EARNME(1))))
  100 CONTINUE
      IF (LABPAT(LOT) .GE. 5 .AND. LABTY .EQ. 4) GO TO 107
      GO TO 106
  107 LABTY = LABPAT(LOT) - 4
      GO TO 102
  106 CONTINUE
C     SETTING OF MONTHLY TOTAL LABOR AND MALE LABOR VALUES
      DO 105 ICMO=1, 12
      FLTOT(ICMO) = FAMLAB(LOT) / 12.
  105 FLMALE(ICMO) = RMALEL / 12.
C     CASH PROCEEDS ASSIGNED TO CONSUMPTION CASH.  THESE WILL NOT
C     BE USED FOR INVESTMENTS IN THE CURRENT YEAR, BUT THE PORTION
C     ALLOTTED TO INVESTMENT IN PRALLO AFTER SUBSISTENCE NEEDS ARE SATISFIED
```

```
      C     WILL BE USED IN THE FOLLOWING YEAR.
            CAPCON(LCT) = CAPCON(LCT) + CASH
            RETURN
            END
END OF FILE
```

WBUEFF

Purpose:	weed burn effects: changes in soil fertility levels resulting from burning weeds (defined as less than 240 days uncultivated).
Kind of routine:	subroutine
Arguments:	LOT lot number IPCH patch number
COMMON areas:	BUCHNG, UBCHNG, BEFORE, RANDOM
Routines called:	ARAND, BRAND
Routine called by:	SOILCH
Program size:	770 bytes

```
      SUBROUTINE WBUEFF(LOT, IPCH)
C     WEED BURN EFFECTS SUBROUTINE
      DOUBLE PRECISION BRAND
      DOUBLE PRECISION UBPHCH, UBPCH, UBALCH, UBNCH,  PHCH, ALCH,
     1 PHBEFF, PBEFF, ALBEFF, BUNEFF, WBQDUR, PHCHME, PCHME, ALCHME,
     1 PCH, BNCH, CBEFF, BNBEFF, PBEFF
      COMMON/BANDOM/ INIT
      COMMON/DUCHNG/ PHCH, ALCH, PCH, BNCH
      COMMON/UBCHNG/ UBPHCH, UBALCH, UBPCH, UBNCH
      COMMON/BEFORE/ PHBEFF, ALBEFF, CBEFF, BNBEFF, PBEFF
      EXTERNAL ARAND, BRAND
C     ALUMINUM CHANGE CALCULATION
      ALCH = 0.
      IF (ALBEFF .LT. 0.001) GO TO 100
      ALCHME = 0.550 - 0.392 * ALBEFF
      ALCH = BRAND(1.855D, ALCHME)
  100 CONTINUE
C     PH CHANGE CALCULATION
      PHCHME = 2.975D0 - 1.650D-1 * ALBEFF - 5.766D1 * PHBEFF
      PHCH = BRAND(7.453D-1, PHCHME)
C     PHOSPHORUS CHANGE CALCULATION
C     PROBABILITY OF NO CHANGE IN PHOSPHORUS
      PCH = 0.
      XRAN = ARAND(INIT, -1.)
      IF (XRAN .LT. 0.262) GO TO 101
C     PHOSPHORUS CHANGES GREATER THAN ZERO
      PCHME = 1.226D0 * UBPCH + 3.9375D0


      PCH = BRAND(5.0023D0, PCHME)
  101 CONTINUE
C     NITROGEN CHANGE CALCULATION
      BUNEFF = BRAND(5.8D-2, -1.3D-2)
      BNCH = UBNCH +BUNEFF
      RETURN
      END
END OF FILE
```

WEABD

Purpose:	weather between dates: computes rainfall, insolation, and evaporation between specified days.
Kind of routine:	subroutine
Arguments:	IBEG beginning day of agricultural year IEND ending day of agricultural year
COMMON areas:	WEATOT, WEACOM
Routines called:	none
Routine called by:	SGBQ, VBQ
Program size:	554 bytes

```
      1            SUBROUTINE WEABOT(IBEG, IEND)
      2      C     WEATHER BETWEEN DATES SUBROUTINE. ARGUMENTS IBEG AND IEND ARE
      3      C     BEGINNING AND ENDING DAYS OF AGRICULTURAL (JULY - JUNE) YEAR.
      4            COMMON/WEATOT/ RAINSU, EVAPSU, RINSSU
      5            COMMON/WEACOM/ RAIN(366), EVAP(366), RINSOL(366)
      6            RAINSU = 0.
      7            EVAPSU = 0.
      8            RINSSU = 0.
      9            DO 100 IAGDA=1,366
     10            ICALDA = IAGDA + 181
     11            IF (IAGDA .GT. 184) ICALDA = IAGDA - 182
     12            IF (IAGDA .GE. IEND) GO TO 103
     13            IF (IAGDA .GE. IBEG) GO TO 102
     14            GO TO 100
     15        102 RAINSU = RAINSU + RAIN(ICALDA)
     16            EVAPSU = EVAPSU + EVAP(ICALDA)
     17            RINSSU = RINSSU + RINSOL(ICALDA)
     18        100 CONTINUE
     19        103 CONTINUE
     20            RETURN
     21            END
END OF FILE
```

WEAGEN

Purpose:	weather generation: produces simulated weather information for each year which is statistically similar to actual weather patterns, including correlations between weather characters and between periods of the year.
Kind of routine:	subroutine
Arguments:	none
COMMON areas:	WEACOM, MOWEA
Routines called:	NODIM, BRAND (information from BLOCK DATA is also used)
Routine called by:	MAIN
Program size:	1908 bytes

```
      SUBROUTINE WEAGEN
C     WEATHER GENERATION SUBROUTINE
      REAL MORAIN, MOEVAP, MOINSO
      DOUBLE PRECISION BRANC
      DIMENSION MORAIN(12), MOEVAP(12), MOINSO(12)
      COMMON/WEACOM/ RAIN(366), EVAP(366), RINSOL(366)
      COMMON/MCWEA/ SORAIN(12), SOEVAP(12), SOINSO(12)
      EXTERNAL NODIM, BRAND
C     PLANTING SEASON RAIN (JAN - MAY) ASSIGNMENT
      PLRAIN = SNGL(BRANC(3.00902, 1.39620D3))
      IF (PLRAIN .LE. 0.) PLRAIN = 0.
      MORAIN(1) = PLRAIN * SNGL(BRANC(5.90-2, 1.780-1))
      MORAIN(2) = PLRAIN * SNGL(BRANC(3.80-2, 2.140-1))
      MORAIN(3) = PLRAIN * SNGL(BRANC(5.00-2, 2.630-1))
      MORAIN(4) = PLRAIN * SNGL(BRANC(5.00-2, 2.140-1))
      MORAIN(5) = PLRAIN * SNGL(BRANC(5.20-2, 1.310-1))
C     MONTHLY RAINFALLS (JUNE - AUGUST)
      MORAIN(6) = SNGL(BRANC(4.82D1, 7.750D1))
      MORAIN(7) = SNGL(BRAND(5.07D1, 9.880D1))
      MORAIN(8) = SNGL(BRAND(2.24D1, 2.810D1))
C     RAIN IN BURNING SEASON (SEPT - DEC)
      BURAIN = SNGL(BRANC(1.48102, 2.817D2))
      IF (BURAIN .LE. 0.) BURAIN = 0.
      MORAIN(9) = BURAIN * SNGL(BRANC(1.090-1, 1.860-1))
      MORAIN(10)= BURAIN * SNGL(BRANC(1.070-1, 1.990-1))
      MORAIN(11)= BURAIN * SNGL(BRANC(1.380-1, 1.850-1))
      MORAIN(12)= BURAIN * SNGL(BRANC(1.030-1, 4.290-1))
      IDAYR = 0
      DO 100 MO = 1, 12
      IF (MORAIN(MO) .LE. 0.) MORAIN(MO) = 0.
C     MONTHLY EVAPORATION ASSIGNMENT
      EVMEAN = 102.0 - 0.150 * MORAIN(MO)
      MOEVAP(MO) = SNGL(BRANC(3.21D1, DBLE(EVMEAN)))
C     MONTHLY INSOLATION ASSIGNMENT
      RINSME = 156.7 - 0.180 * MORAIN(MO)
      MOINSO(MO) = SNGL(BRAND(4.41D1, DBLE(RINSME)))
      MODAYS = NODIM(MO, 1)
      PRMOTO = 1. / FLOAT(MODAYS)
      IF (MOEVAP(MO) .LE. 0.) MOEVAP(MO) = 0.
      IF (MOINSO(MO) .LE. 0.) MOINSO(MO) = 0.
      DO 101 IDAY = 1, MODAYS
      IDAYR = IDAYR + 1
C     ASSIGNMENT OF RAIN, EVAPORATION AND INSOLATION FOR DAY OF YEAR
      RAIN(IDAYR) = MORAIN(MO) * SNGL(BRANC(DBLE(SORAIN(MO)),
     1 DBLE(PRMOTO)))
      EVAP(IDAYR) = MOEVAP(MO) * SNGL(BRAND(DBLE(SOEVAP(MO)),
     1 DBLE(PRMOTO)))
      RINSOL(IDAYR) = MOINSO(MO) * SNGL(BRAND(DBLE(SOINSO(MO)),
     1 DBLE(PRMOTO)))
      IF (RAIN(IDAYR) .LE. 0.) RAIN(IDAYR) = 0.
      IF (EVAP(IDAYR) .LE. 0.) EVAP(IDAYR) = 0.
      IF (RINSOL(IDAYR) .LE. 0.) RINSOL(IDAYR) = 0.
  101 CONTINUE
  100 CONTINUE
      RETURN
      END
END OF FILE
```

INPUT DATA FORMAT

DATA ENTERED AT THE TERMINAL (logical input/output unit 5):

RECORD	COLUMNS	FORMAT	VARIABLE
1	1-3	I3	NORUN - run number
2	1	I1	ISTOCH - run type (1=determinist 2=stochastic)
3	1	I1	IFREEZ - population sector (1 = frozen, 2 = dynamic)
4	1-3	I3	IYEARS - years to simulate
5	1-3	I3	LOTS - number of lots
6	1-3	I3	NOPCHS - number of patches per l
7	1	I1	IOUTPT - output request (1 = plo and list, 2 = list only
8	1	I1	LUOUTP - land use output request (1 = yes, 2 = no)
9	1-4	F4.0	SIZLOT - size of lot (hectares)
10	1-7	I7	INIT - seed for random number (large odd number for repeatable number, 0 for automatic non-repeatable number)

DATA IN DATA FILE (logical input/output unit 14 = BANKDATA)

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
1	1-6	F6.2	PROB(1,1,1)	0.00
1	7-12	F6.2	PROB(2,1,1)	0.33
1	13-18	F6.2	PROB(3,1,1)	0.00
1	19-24	F6.2	PROB(4,1,1)	0.33
1	25-30	F6.2	PROB(5,1,1)	0.00
1	31-36	F6.2	PROB(6,1,1)	0.00
1	37-42	F6.2	PROB(7,1,1)	0.00
2	1-6	F6.2	PROB(1,2,1)	0.09
2	7-12	F6.2	PROB(2,2,1)	0.73
2	13-18	F6.2	PROB(3,2,1)	0.09
2	19-24	F6.2	PROB(4,2,1)	0.00
2	25-30	F6.2	PROB(5,2,1)	0.00
2	31-36	F6.2	PROB(6,2,1)	0.00
2	37-42	F6.2	PROB(7,2,1)	0.09
3	1-6	F6.2	PROB(1,3,1)	0.00
3	7-12	F6.2	PROB(2,3,1)	0.17
3	13-18	F6.2	PROB(3,3,1)	0.33
3	19-24	F6.2	PROB(4,3,1)	0.00
3	25-30	F6.2	PROB(5,3,1)	0.50
3	31-36	F6.2	PROB(6,3,1)	0.00
3	37-42	F6.2	PROB(7,3,1)	0.00
4	1-6	F6.2	PROB(1,4,1)	0.09
4	7-12	F6.2	PROB(2,4,1)	0.00
4	13-18	F6.2	PROB(3,4,1)	0.00
4	19-24	F6.2	PROB(4,4,1)	0.36
4	25-30	F6.2	PROB(5,4,1)	0.36
4	31-36	F6.2	PROB(6,4,1)	0.18
4	37-42	F6.2	PROB(7,4,1)	0.00

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
5	1-6	F6.2	PROB(1,5,1)	0.11
5	7-12	F6.2	PROB(2,5,1)	0.00
5	13-18	F6.2	PROB(3,5,1)	0.33
5	19-24	F6.2	PROB(4,5,1)	0.44
5	25-30	F6.2	PROB(5,5,1)	0.00
5	31-36	F6.2	PROB(6,5,1)	0.11
5	37-42	F6.2	PROB(7,5,1)	0.00
6	1-6	F6.2	PROB(1,6,1)	0.00
6	7-12	F6.2	PROB(2,6,1)	0.00
6	13-18	F6.2	PROB(3,6,1)	0.00
6	19-24	F6.2	PROB(4,6,1)	0.40
6	25-30	F6.2	PROB(5,6,1)	0.20
6	31-36	F6.2	PROB(6,6,1)	0.40
6	37-42	F6.2	PROB(7,6,1)	0.00
7	1-6	F6.2	PROB(1,7,1)	0.00
7	7-12	F6.2	PROB(2,7,1)	1.00
7	13-18	F6.2	PROB(3,7,1)	0.00
7	19-24	F6.2	PROB(4,7,1)	0.00
7	25-30	F6.2	PROB(5,7,1)	0.00
7	31-36	F6.2	PROB(6,7,1)	0.00
7	37-42	F6.2	PROB(7,7,1)	0.00
8	1-6	F6.2	PROB(1,1,2)	0.40
8	7-12	F6.2	PROB(2,1,2)	0.43
8	13-18	F6.2	PROB(3,1,2)	0.09
8	19-24	F6.2	PROB(4,1,2)	0.06
8	25-30	F6.2	PROB(5,1,2)	0.00
8	31-36	F6.2	PROB(6,1,2)	0.00
8	37-42	F6.2	PROB(7,1,2)	0.03
9	1-6	F6.2	PROB(1,2,2)	0.25
9	7-12	F6.2	PROB(2,2,2)	0.43

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
9	13-18	F6.2	PROB(3,2,2)	0.15
9	19-24	F6.2	PROB(4,2,2)	0.08
9	25-30	F6.2	PROB(5,2,2)	0.08
9	31-36	F6.2	PROB(6,2,2)	0.02
9	37-42	F6.2	PROB(7,2,2)	0.00
10	1-6	F6.2	PROB(1,3,2)	0.12
10	7-12	F6.2	PROB(2,3,2)	0.36
10	13-18	F6.2	PROB(3,3,2)	0.24
10	19-24	F6.2	PROB(4,3,2)	0.08
10	25-30	F6.2	PROB(5,3,2)	0.12
10	31-36	F6.2	PROB(6,3,2)	0.08
10	37-42	F6.2	PROB(7,3,2)	0.00
11	1-6	F6.2	PROB(1,4,2)	0.12
11	7-12	F6.2	PROB(2,4,2)	0.29
11	13-18	F6.2	PROB(3,4,2)	0.12
11	19-24	F6.2	PROB(4,4,2)	0.24
11	25-30	F6.2	PROB(5,4,2)	0.24
11	31-36	F6.2	PROB(6,4,2)	0.00
11	37-42	F6.2	PROB(7,4,2)	0.00
12	1-6	F6.2	PROB(1,5,2)	0.00
12	7-12	F6.2	PROB(2,5,2)	0.25
12	13-18	F6.2	PROB(3,5,2)	0.15
12	19-24	F6.2	PROB(4,5,2)	0.20
12	25-30	F6.2	PROB(5,5,2)	0.30
12	31-36	F6.2	PROB(6,5,2)	0.10
12	37-42	F6.2	PROB(7,5,2)	0.00
13	1-6	F6.2	PROB(1,6,2)	0.00
13	7-12	F6.2	PROB(2,6,2)	0.20
13	13-18	F6.2	PROB(3,6,2)	0.40
13	19-24	F6.2	PROB(4,6,2)	0.00
13	25-30	F6.2	PROB(5,6,2)	0.40

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
13	31-36	F6.2	PROB(6,6,2)	0.00
13	37-42	F6.2	PROB(7,6,2)	0.00
14	1-6	F6.2	PROB(1,7,2)	1.00
14	7-12	F6.2	PROB(2,7,2)	0.00
14	13-18	F6.2	PROB(3,7,2)	0.00
14	19-24	F6.2	PROB(4,7,2)	0.00
14	25-30	F6.2	PROB(5,7,2)	0.00
14	31-36	F6.2	PROB(6,7,2)	0.00
14	37-42	F6.2	PROB(7,7,2)	0.00
15	1-5	F5.2	PRI	0.43
15	6-10	F5.2	PRIMZ	0.41
15	11-15	F5.2	PRIBM	0.07
15	16-20	F5.2	PRISM	0.01
15	21-25	F5.2	PRIMZS	0.01
15	26-30	F5.2	PRIPA	0.03
15	31-35	F5.2	PRIMZB	0.04
16	1-5	F5.2	PRPS	0.90
17	1-5	F5.2	PRIVI	0.32
18	1-5	F5.2	PRBM	0.62
18	6-10	F5.2	PRBMRI	0.00
18	11-15	F5.2	PRBMMZ	0.08
19	1-5	F5.2	PRSM	0.91
19	6-10	F5.2	PRSMRI	0.00
19	11-15	F5.2	PRSMMZ	0.00
20	1-5	F5.2	PLU(1,1)	0.66
20	6-10	F5.2	PLU(1,2)	0.09
20	11-15	F5.2	PLU(1,3)	0.07
20	16-20	F5.2	PLU(1,4)	0.00

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
20	21-25	F5.2	PLU(1,5)	0.07
20	26-30	F5.2	PLU(1,6)	0.01
20	31-35	F5.2	PLU(1,7)	0.00
20	36-40	F5.2	PLU(1,8)	0.00
20	41-45	F5.2	PLU(1,9)	0.10
20	46-50	F5.2	PLU(1,10)	0.00
21	1-5	F5.2	PLU(2,1)	0.54
21	6-10	F5.2	PLU(2,2)	0.16
21	11-15	F5.2	PLU(2,3)	0.02
21	16-20	F5.2	PLU(2,4)	0.00
21	21-25	F5.2	PLU(2,5)	0.06
21	26-30	F5.2	PLU(2,6)	0.00
21	31-35	F5.2	PLU(2,7)	0.07
21	36-40	F5.2	PLU(2,8)	0.03
21	41-45	F5.2	PLU(2,9)	0.12
21	46-50	F5.2	PLU(2,10)	0.00
22	1-5	F5.2	PLU(3,1)	0.35
22	6-10	F5.2	PLU(3,2)	0.03
22	11-15	F5.2	PLU(3,3)	0.05
22	16-20	F5.2	PLU(3,4)	0.00
22	21-25	F5.2	PLU(3,5)	0.05
22	26-30	F5.2	PLU(3,6)	0.00
22	31-35	F5.2	PLU(3,7)	0.00
22	36-40	F5.2	PLU(3,8)	0.00
22	41-45	F5.2	PLU(3,9)	0.40
22	46-50	F5.2	PLU(3,10)	0.12

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
23	1-5	F5.2	PLU(4,1)	0.83
23	6-10	F5.2	PLU(4,2)	0.00
23	11-15	F5.2	PLU(4,3)	0.17
23	16-20	F5.2	PLU(4,4)	0.00
23	21-25	F5.2	PLU(4,5)	0.00
23	26-30	F5.2	PLU(4,6)	0.00
23	31-35	F5.2	PLU(4,7)	0.00
23	36-40	F5.2	PLU(4,8)	0.00
23	41-45	F5.2	PLU(4,9)	0.00
23	46-50	F5.2	PLU(4,10)	0.00
24	1-5	F5.2	PCAGPE	0.03
24	6-10	F5.2	PPEGCA	0.00
25	1-6	F6.1	REQTL(1,1)	0.0
25	7-12	F6.1	REQTL(2,1)	0.0
25	13-18	F6.1	REQTL(3,1)	0.0
25	19-24	F6.1	REQTL(4,1)	0.0
25	25-30	F6.1	REQTL(5,1)	0.0
25	31-36	F6.1	REQTL(6,1)	0.0
25	37-42	F6.1	REQTL(7,1)	6.9
25	43-48	F6.1	REQTL(8,1)	6.9
25	49-54	F6.1	REQTL(9,1)	6.9
25	55-60	F6.1	REQTL(10,1)	8.0
25	61-66	F6.1	REQTL(11,1)	0.0
25	67-72	F6.1	REQTL(12,1)	0.0
26	1-6	F6.1	REQTL(1,2)	0.0
26	7-12	F6.1	REQTL(2,2)	0.0
26	13-18	F6.1	REQTL(3,2)	0.0

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
26	19-24	F6.1	REQTL(4,2)	0.0
26	25-30	F6.1	REQTL(5,2)	0.0
26	26-36	F6.1	REQTL(6,2)	0.0
26	37-42	F6.1	REQTL(7,2)	0.0
26	43-48	F6.1	REQTL(8,2)	0.0
26	49-54	F6.1	REQTL(9,2)	10.0
26	55-60	F6.1	REQTL(10,2)	10.0
26	61-66	F6.1	REQTL(11,2)	4.8
26	67-72	F6.1	REQTL(12,2)	0.0
27	1-6	F6.1	REQTL(1,3)	0.0
27	7-12	F6.1	REQTL(2,3)	0.0
27	13-18	F6.1	REQTL(3,3)	0.0
27	19-24	F6.1	REQTL(4,3)	0.0
27	25-30	F6.1	REQTL(5,3)	0.0
27	31-36	F6.1	REQTL(6,3)	0.0
27	37-42	F6.1	REQTL(7,3)	0.0
27	43-48	F6.1	REQTL(8,3)	0.0
27	49-54	F6.1	REQTL(9,3)	0.0
27	55-60	F6.1	REQTL(10,3)	7.0
27	61-66	F6.1	REQTL(11,3)	1.7
27	67-72	F6.1	REQTL(12,3)	0.0
28	1-6	F6.1	REQTL(1,4)	6.3
28	7-12	F6.1	REQTL(2,4)	3.7
28	13-18	F6.1	REQTL(3,4)	3.7
28	19-24	F6.1	REQTL(4,4)	0.0
28	25-30	F6.1	REQTL(5,4)	0.0
28	31-36	F6.1	REQTL(6,4)	14.1

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
28	37-42	F6.1	REQTL(7,4)	4.1
28	43-48	F6.1	REQTL(8,4)	0.0
28	49-54	F6.1	REQTL(9,4)	0.0
28	55-60	F6.1	REQTL(10,4)	0.0
28	61-66	F6.1	REQTL(11,4)	0.0
28	67-72	F6.1	REQTL(12,4)	0.0
29	1-6	F6.1	REQTL(1,5)	0.0
29	7-12	F6.1	REQTL(2,5)	4.7
29	13-18	F6.1	REQTL(3,5)	4.7
29	19-24	F6.1	REQTL(4,5)	0.0
29	25-30	F6.1	REQTL(5,5)	0.0
29	31-36	F6.1	REQTL(6,5)	0.0
29	37-42	F6.1	REQTL(7,5)	0.0
29	43-48	F6.1	REQTL(8,5)	5.0
29	49-54	F6.1	REQTL(9,5)	5.0
29	55-60	F6.1	REQTL(10,5)	0.0
29	61-66	F6.1	REQTL(11,5)	0.0
29	67-72	F6.1	REQTL(12,5)	2.0
30	1-6	F6.1	REQTL(1,6)	0.0
30	7-12	F6.1	REQTL(2,6)	0.0
30	13-18	F6.1	REQTL(3,6)	0.0
30	19-24	F6.1	REQTL(4,6)	13.4
30	25-30	F6.1	REQTL(5,6)	0.0
30	31-36	F6.1	REQTL(6,6)	6.2
30	37-42	F6.1	REQTL(7,6)	11.2
30	43-48	F6.1	REQTL(8,6)	0.0
30	49-54	F6.1	REQTL(9,6)	0.0

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
30	55-60	F6.1	REQTL(10,6)	0.0
30	61-66	F6.1	REQTL(11,6)	0.0
30	67-72	F6.1	REQTL(12,6)	0.0
31	1-6	F6.1	REQTL(1,7)	0.0
31	7-12	F6.1	REQTL(2,7)	20.3
31	13-18	F6.1	REQTL(3,7)	20.3
31	19-24	F6.1	REQTL(4,7)	20.3
31	25-30	F6.1	REQTL(5,7)	20.3
31	31-36	F6.1	REQTL(6,7)	0.0
31	37-42	F6.1	REQTL(7,7)	0.0
31	43-48	F6.1	REQTL(8,7)	0.0
31	49-54	F6.1	REQTL(9,7)	0.0
31	55-60	F6.1	REQTL(10,7)	0.0
31	61-66	F6.1	REQTL(11,7)	20.3
31	67-72	F6.1	REQTL(12,7)	20.3
32	1-6	F6.1	REQTL(1,8)	20.0
32	7-12	F6.1	REQTL(2,8)	0.0
32	13-18	F6.1	REQTL(3,8)	0.0
32	19-24	F6.1	REQTL(4,8)	0.0
32	25-30	F6.1	REQTL(5,8)	0.0
32	31-36	F6.1	REQTL(6,8)	0.0
32	37-42	F6.1	REQTL(7,8)	0.0
32	43-48	F6.1	REQTL(8,8)	15.0
32	49-54	F6.1	REQTL(9,8)	6.0
32	55-60	F6.1	REQTL(10,8)	0.0
32	61-66	F6.1	REQTL(11,8)	22.0
32	67-72	F6.1	REQTL(12,8)	22.0
33	1-6	F6.1	REQTL(1,9)	27.0
33	7-12	F6.1	REQTL(2,9)	13.5

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
33	13-18	F6.1	REQTL(3,9)	1.5
33	19-24	F6.1	REQTL(4,9)	4.5
33	25-30	F6.1	REQTL(5,9)	12.0
33	31-36	F6.1	REQTL(6,9)	0.0
33	37-42	F6.1	REQTL(7,9)	46.3
33	43-48	F6.1	REQTL(8,9)	46.3
33	49-54	F6.1	REQTL(9,9)	10.0
33	55-60	F6.1	REQTL(10,9)	30.0
33	61-66	F6.1	REQTL(11,9)	24.0
33	67-72	F6.1	REQTL(12,9)	0.0
34	1-6	F6.1	REQTL(1,10)	2.3
34	7-12	F6.1	REQTL(2,10)	0.0
34	13-18	F6.1	REQTL(3,10)	0.0
34	19-24	F6.1	REQTL(4,10)	0.0
34	25-30	F6.1	REQTL(5,10)	0.0
34	31-36	F6.1	REQTL(6,10)	0.0
34	37-42	F6.1	REQTL(7,10)	0.0
34	43-48	F6.1	REQTL(8,10)	0.0
34	49-54	F6.1	REQTL(9,10)	0.0
34	55-60	F6.1	REQTL(10,10)	3.0
34	61-66	F6.1	REQTL(11,10)	0.0
34	67-72	F6.1	REQTL(12,10)	0.0
35	1-6	F6.1	REQTL(1,11)	0.0
35	7-12	F6.1	REQTL(2,11)	0.0
35	13-18	F6.1	REQTL(3,11)	0.0
35	19-24	F6.1	REQTL(4,11)	0.0

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
35	25-30	F6.1	REQTL(5,11)	0.0
35	31-36	F6.1	REQTL(6,11)	0.0
35	37-42	F6.1	REQTL(7,11)	4.7
35	43-48	F6.1	REQTL(8,11)	4.7
35	49-54	F6.1	REQTL(9,11)	0.0
35	55-60	F6.1	REQTL(10,11)	0.0
35	61-66	F6.1	REQTL(11,11)	0.0
35	67-72	F6.1	REQTL(12,11)	0.0
36	1-6	F6.1	REQTL(1,12)	9.0
36	7-12	F6.1	REQTL(2,12)	9.0
36	13-18	F6.1	REQTL(3,12)	9.0
36	19-24	F6.1	REQTL(4,12)	9.0
36	25-30	F6.1	REQTL(5,12)	9.0
36	31-36	F6.1	REQTL(6,12)	9.0
36	37-42	F6.1	REQTL(7,12)	9.0
36	43-48	F6.1	REQTL(8,12)	9.0
36	49-54	F6.1	REQTL(9,12)	9.0
36	55-60	F6.1	REQTL(10,12)	9.0
36	61-66	F6.1	REQTL(11,12)	9.0
36	67-72	F6.1	REQTL(12,12)	9.0
37	1-6	F6.1	REQTL(1,13)	1.5
37	7-12	F6.1	REQTL(2,13)	9.0
37	13-18	F6.1	REQTL(3,13)	2.5
37	19-24	F6.1	REQTL(4,13)	1.5
37	25-30	F6.1	REQTL(5,13)	0.0
37	31-36	F6.1	REQTL(6,13)	11.5
37	37-42	F6.1	REQTL(7,13)	1.5

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
37	43-48	F6.1	REQTL(8,13)	9.0
37	49-54	F6.1	REQTL(9,13)	2.5
37	55-60	F6.1	REQTL(10,13)	0.0
37	61-66	F6.1	REQTL(11,13)	9.0
37	67-72	F6.1	REQTL(12,13)	2.5
38	1-6	F6.1	REQTL(1,14)	0.0
38	7-12	F6.1	REQTL(2,14)	0.0
38	13-18	F6.1	REQTL(3,14)	0.0
38	19-24	F6.1	REQTL(4,14)	0.0
38	25-30	F6.1	REQTL(5,14)	0.0
38	31-36	F6.1	REQTL(6,14)	0.0
38	37-42	F6.1	REQTL(7,14)	1.0
38	43-48	F6.1	REQTL(8,14)	1.0
38	49-54	F6.1	REQTL(9,14)	0.0
38	55-60	F6.1	REQTL(10,14)	0.0
38	61-66	F6.1	REQTL(11,14)	0.0
38	67-72	F6.1	REQTL(12,14)	0.0
39	1-6	F6.1	REQTL(1,15)	0.6
39	7-12	F6.1	REQTL(2,15)	0.6
39	13-18	F6.1	REQTL(3,15)	0.6
39	19-24	F6.1	REQTL(4,15)	0.6
39	25-30	F6.1	REQTL(5,15)	0.6
39	31-36	F6.1	REQTL(6,15)	0.6
39	37-42	F6.1	REQTL(7,15)	4.1
39	43-48	F6.1	REQTL(8,15)	4.1
39	49-54	F6.1	REQTL(9,15)	0.6
39	55-60	F6.1	REQTL(10,15)	0.6

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
39	61-66	F6.1	REQTL(11,15)	0.6
39	67-72	F6.1	REQTL(12,15)	0.6
40	1-6	F6.1	REQML(1,1)	0.0
40	7-12	F6.1	REQML(2,1)	0.0
40	13-18	F6.1	REQML(3,1)	0.0
40	19-24	F6.1	REQML(4,1)	0.0
40	25-30	F6.1	REQML(5,1)	0.0
40	31-36	F6.1	REQML(6,1)	0.0
40	37-42	F6.1	REQML(7,1)	6.9
40	43-48	F6.1	REQML(8,1)	6.9
40	49-54	F6.1	REQML(9,1)	6.9
40	55-60	F6.1	REQML(10,1)	8.0
40	61-66	F6.1	REQML(11,1)	0.0
40	67-72	F6.1	REQML(12,1)	0.0
41	1-6	F6.1	REQML(1,2)	0.0
41	7-12	F6.1	REQML(2,2)	0.0
41	13-18	F6.1	REQML(3,2)	0.0
41	19-24	F6.1	REQML(4,2)	0.0
41	25-30	F6.1	REQML(5,2)	0.0
41	31-36	F6.1	REQML(6,2)	0.0
41	37-42	F6.1	REQML(7,2)	0.0
41	43-48	F6.1	REQML(8,2)	0.0
41	44-54	F6.1	REQML(9,2)	10.0
41	55-60	F6.1	REQML(10,2)	10.0
41	61-66	F6.1	REQML(11,2)	4.8
41	67-72	F6.1	REQML(12,2)	0.0

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
42	1-6	F6.1	REQML(1,3)	0.0
42	7-12	F6.1	REQML(2,3)	0.0
42	13-18	F6.1	REQML(3,3)	0.0
42	19-24	F6.1	REQML(4,3)	0.0
42	25-30	F6.1	REQML(5,3)	0.0
42	31-36	F6.1	REQML(6,3)	0.0
42	37-42	F6.1	REQML(7,3)	0.0
42	43-48	F6.1	REQML(8,3)	0.0
42	49-54	F6.1	REQML(9,3)	0.0
42	55-60	F6.1	REQML(10,3)	7.0
42	61-66	F6.1	REQML(11,3)	1.7
42	67-72	F6.1	REQML(12,3)	0.0
43	1-6	F6.1	REQML(1,4)	2.5
43	7-12	F6.1	REQML(2,4)	0.0
43	13-18	F6.1	REQML(3,4)	0.0
43	19-24	F6.1	REQML(4,4)	0.0
43	25-30	F6.1	REQML(5,4)	0.0
43	31-36	F6.1	REQML(6,4)	14.1
43	37-42	F6.1	REQML(7,4)	4.1
43	43-48	F6.1	REQML(8,4)	0.0
43	49-54	F6.1	REQML(9,4)	0.0
43	55-60	F6.1	REQML(10,4)	0.0
43	61-66	F6.1	REQML(11,4)	0.0
43	67-72	F6.1	REQML(12,4)	0.0
44	1-6	F6.1	REQML(1,5)	0.0
44	7-12	F6.1	REQML(2,5)	0.0

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
44	13-18	F6.1	REQML(3,5)	0.0
44	19-24	F6.1	REQML(4,5)	0.0
44	25-30	F6.1	REQML(5,5)	0.0
44	31-36	F6.1	REQML(6,5)	0.0
44	37-42	F6.1	REQML(7,5)	0.0
44	43-48	F6.1	REQML(8,5)	2.5
44	49-54	F6.1	REQML(9,5)	2.5
44	55-60	F6.1	REQML(10,5)	0.0
44	61-66	F6.1	REQML(11,5)	2.0
44	67-72	F6.1	REQML(12,5)	0.0
45	1-6	F6.1	REQML(1,6)	0.0
45	7-12	F6.1	REQML(2,6)	0.0
45	13-18	F6.1	REQML(3,6)	0.0
45	19-24	F6.1	REQML(4,6)	13.4
45	25-30	F6.1	REQML(5,6)	0.0
45	31-36	F6.1	REQML(6,6)	0.0
45	37-42	F6.1	REQML(7,6)	5.0
45	43-48	F6.1	REQML(8,6)	0.0
45	49-54	F6.1	REQML(9,6)	0.0
45	55-60	F6.1	REQML(10,6)	0.0
45	61-66	F6.1	REQML(11,6)	0.0
45	67-72	F6.1	REQML(12,6)	0.0
46	1-6	F6.1	REQML(1,7)	0.0
46	7-12	F6.1	REQML(2,7)	10.8
46	13-18	F6.1	REQML(3,7)	10.8
46	19-24	F6.1	REQML(4,7)	10.8

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
46	25-30	F6.1	REQML(5,7)	10.8
46	31-36	F6.1	REQML(6,7)	0.0
46	37-42	F6.1	REQML(7,7)	0.0
46	43-48	F6.1	REQML(8,7)	0.0
46	49-54	F6.1	REQML(9,7)	0.0
46	55-60	F6.1	REQML(10,7)	0.0
46	61-66	F6.1	REQML(11,7)	10.8
46	67-72	F6.1	REQML(12,7)	10.8
47	1-6	F6.1	REQML(1,8)	20.0
47	7-12	F6.1	REQML(2,8)	0.0
47	13-18	F6.1	REQML(3,8)	0.0
47	19-24	F6.1	REQML(4,8)	0.0
47	25-30	F6.1	REQML(5,8)	0.0
47	31-36	F6.1	REQML(6,8)	0.0
47	37-42	F6.1	REQML(7,8)	0.0
47	43-48	F6.1	REQML(8,8)	9.0
47	49-54	F6.1	REQML(9,8)	6.0
47	55-60	F6.1	REQML(10,8)	0.0
47	61-66	F6.1	REQML(11,8)	22.0
47	67-72	F6.1	REQML(12,8)	22.0
48	1-6	F6.1	REQML(1,9)	27.0
48	7-12	F6.1	REQML(2,9)	0.0
48	13-18	F6.1	REQML(3,9)	1.5
48	19-24	F6.1	REQML(4,9)	0.0
48	25-30	F6.1	REQML(5,9)	0.0
48	31-36	F6.1	REQML(6,9)	0.0
48	37-42	F6.1	REQML(7,9)	46.3

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
48	43-48	F6.1	REQML(8,9)	46.3
48	49-54	F6.1	REQML(9,9)	10.0
48	55-60	F6.1	REQML(10,9)	30.0
48	61-66	F6.1	REQML(11,9)	24.0
48	67-72	F6.1	REQML(12,9)	0.0
49	1-6	F6.1	REQML(1,10)	2.3
49	7-12	F6.1	REQML(2,10)	0.0
49	13-18	F6.1	REQML(3,10)	0.0
49	19-24	F6.1	REQML(4,10)	0.0
49	25-30	F6.1	REQML(5,10)	0.0
49	31-36	F6.1	REQML(6,10)	0.0
49	37-42	F6.1	REQML(7,10)	0.0
49	43-48	F6.1	REQML(8,10)	0.0
49	49-54	F6.1	REQML(9,10)	0.0
49	55-60	F6.1	REQML(10,10)	0.0
49	61-66	F6.1	REQML(11,10)	0.0
49	67-72	F6.1	REQML(12,10)	0.0
50	1-6	F6.1	REQML(1,11)	0.0
50	7-12	F6.1	REQML(2,11)	0.0
50	13-18	F6.1	REQML(3,11)	0.0
50	19-24	F6.1	REQML(4,11)	0.0
50	25-30	F6.1	REQML(5,11)	0.0
50	31-36	F6.1	REQML(6,11)	0.0
50	37-42	F6.1	REQML(7,11)	4.7
50	43-48	F6.1	REQML(8,11)	4.7
50	49-54	F6.1	REQML(9,11)	0.0
50	55-60	F6.1	REQML(10,11)	0.0

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
50	61-66	F6.1	REQML(11,11)	0.0
50	67-72	F6.1	REQML(12,11)	0.0
51	1-6	F6.1	REQML(1,12)	5.5
51	7-12	F6.1	REQML(2,12)	5.5
51	13-18	F6.1	REQML(3,12)	5.5
51	19-24	F6.1	REQML(4,12)	5.5
51	25-30	F6.1	REQML(5,12)	5.5
51	31-36	F6.1	REQML(6,12)	5.5
51	37-42	F6.1	REQML(7,12)	5.5
51	43-48	F6.1	REQML(8,12)	5.5
51	49-54	F6.1	REQML(9,12)	5.5
51	55-60	F6.1	REQML(10,12)	5.5
51	61-66	F6.1	REQML(11,12)	5.5
51	67-72	F6.1	REQML(12,12)	5.5
52	1-6	F6.1	REQML(1,13)	1.5
52	7-12	F6.1	REQML(2,13)	0.0
52	13-18	F6.1	REQML(3,13)	0.0
52	19-24	F6.1	REQML(4,13)	1.5
52	25-30	F6.1	REQML(5,13)	0.0
52	31-36	F6.1	REQML(6,16)	10.0
52	37-42	F6.1	REQML(7,13)	1.5
52	43-48	F6.1	REQML(8,13)	0.0
52	49-54	F6.1	REQML(9,13)	0.0
52	55-60	F6.1	REQML(10,13)	0.0
52	61-66	F6.1	REQML(11,13)	0.0
52	67-72	F6.1	REQML(12,13)	0.0
53	1-6	F6.1	REQML(1,14)	0.0

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
53	7-12	F6.1	REQML(2,14)	0.0
53	13-18	F6.1	REQML(3,14)	0.0
53	19-24	F6.1	REQML(4,14)	0.0
53	25-30	F6.1	REQML(5,14)	0.0
53	31-36	F6.1	REQML(6,14)	0.0
53	37-42	F6.1	REQML(7,14)	1.0
53	43-48	F6.1	REQML(8,14)	1.0
53	49-54	F6.1	REQML(9,14)	0.0
53	55-60	F6.1	REQML(10,14)	0.0
53	61-66	F6.1	REQML(11,14)	0.0
53	67-72	F6.1	REQML(12,14)	0.0
54	1-6	F6.1	REQML(1,15)	0.6
54	7-12	F6.1	REQML(2,15)	0.6
54	13-18	F6.1	REQML(3,15)	0.6
54	19-24	F6.1	REQML(4,15)	0.6
54	25-30	F6.1	REQML(5,15)	0.6
54	31-36	F6.1	REQML(6,15)	0.6
54	37-42	F6.1	REQML(7,15)	0.6
54	43-48	F6.1	REQML(8,15)	0.6
54	49-54	F6.1	REQML(9,15)	0.6
54	55-60	F6.1	REQML(10,15)	0.6
54	61-66	F6.1	REQML(11,15)	0.6
54	67-72	F6.1	REQML(12,15)	0.6
55	1-6	F6.0	REQFC(1,1)	0
55	7-12	F6.0	REQFC(2,1)	0
55	13-18	F6.0	REQFC(3,1)	0
55	19-24	F6.0	REQFC(4,1)	0

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
55	25-30	F6.0	REQFC(5,1)	0
55	31-36	F6.0	REQFC(6,1)	0
55	37-42	F6.0	REQFC(7,1)	0
55	43-48	F6.0	REQFC(8,1)	0
55	49-54	F6.0	REQFC(9,1)	0
55	55-60	F6.0	REQFC(10,1)	0
55	61-66	F6.0	REQFC(11,1)	0
55	67-72	F6.0	REQFC(12,1)	0
56	1-6	F6.0	REQFC(1,2)	0
56	7-12	F6.0	REQFC(2,2)	0
56	13-18	F6.0	REQFC(3,2)	0
56	19-24	F6.0	REQFC(4,2)	0
56	25-30	F6.0	REQFC(5,2)	0
56	31-36	F6.0	REQFC(6,2)	0
56	37-42	F6.0	REQFC(7,2)	0
56	43-48	F6.0	REQFC(8,2)	0
56	49-54	F6.0	REQFC(9,2)	0
56	55-60	F6.0	REQFC(10,2)	0
56	61-66	F6.0	REQFC(11,2)	0
56	67-72	F6.0	REQFC(12,2)	0
57	1-6	F6.0	REQFC(1,3)	0
57	7-12	F6.0	REQFC(2,3)	0
57	13-18	F6.0	REQFC(3,3)	0
57	19-24	F6.0	REQFC(4,3)	0
57	25-30	F6.0	REQFC(5,3)	0
57	31-36	F6.0	REQFC(6,3)	0

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
57	37-42	F6.0	REQFC(7,3)	0
57	43-48	F6.0	REQFC(8,3)	0
57	49-54	F6.0	REQFC(9,3)	0
57	55-60	F6.0	REQFC(10,3)	0
57	61-66	F6.0	REQFC(11,3)	0
57	67-72	F6.0	REQFC(12,3)	0
58	1-6	F6.0	REQFC(1,4)	0
58	7-12	F6.0	REQFC(2,4)	0
58	13-18	F6.0	REQFC(3,4)	0
58	19-24	F6.0	REQFC(4,4)	0
58	25-30	F6.0	REQFC(5,4)	0
58	31-36	F6.0	REQFC(6,4)	18
58	37-42	F6.0	REQFC(7,4)	0
58	43-48	F6.0	REQFC(8,4)	0
58	49-54	F6.0	REQFC(9,4)	0
58	55-60	F6.0	REQFC(10,4)	0
58	61-66	F6.0	REQFC(11,4)	0
58	67-72	F6.0	REQFC(12,4)	0
59	1-6	F6.0	REQFC(1,5)	0
59	7-13	F6.0	REQFC(2,5)	0
59	14-18	F6.0	REQFC(3,5)	0
59	19-24	F6.0	REQFC(4,5)	0
59	25-30	F6.0	REQFC(5,5)	0
59	31-36	F6.0	REQFC(6,5)	0
59	37-42	F6.0	REQFC(7,5)	0
59	43-48	F6.0	REQFC(8,5)	0
59	49-54	F6.0	REQFC(9,5)	0

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
59	55-60	F6.0	REQFC(10,5)	0
59	61-66	F6.0	REQFC(11,5)	0
59	67-72	F6.0	REQFC(12,5)	10
60	1-6	F6.0	REQFC(1,6)	0
60	7-12	F6.0	REQFC(2,6)	0
60	13-18	F6.0	REQFC(3,6)	0
60	19-24	F6.0	REQFC(4,6)	8
60	25-30	F6.0	REQFC(5,6)	0
60	31-36	F6.0	REQFC(6,6)	0
60	37-42	F6.0	REQFC(7,6)	0
60	43-48	F6.0	REQFC(8,6)	0
60	49-54	F6.0	REQFC(9,6)	0
60	55-60	F6.0	REQFC(10,6)	0
60	61-66	F6.0	REQFC(11,6)	0
60	67-72	F6.0	REQFC(12,6)	0
61	1-6	F6.0	REQFC(1,7)	30
61	7-12	F6.0	REQFC(2,7)	30
61	13-18	F6.0	REQFC(3,7)	30
61	19-24	F6.0	REQFC(4,7)	30
61	25-30	F6.0	REQFC(5,7)	30
61	31-36	F6.0	REQFC(6,7)	30
61	37-42	F6.0	REQFC(7,7)	30
61	43-48	F6.0	REQFC(8,7)	30
61	49-54	F6.0	REQFC(9,7)	30
61	55-60	F6.0	REQFC(10,7)	30
61	61-66	F6.0	REQFC(11,7)	30
61	67-72	F6.0	REQFC(12,7)	30

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
62	1-6	F6.0	REQFC(1,8)	726
62	7-12	F6.0	REQFC(2,8)	0
62	13-18	F6.0	REQFC(3,8)	0
62	19-24	F6.0	REQFC(4,8)	0
62	25-30	F6.0	REQFC(5,8)	0
62	31-36	F6.0	REQFC(6,8)	0
62	37-42	F6.0	REQFC(7,8)	0
62	43-48	F6.0	REQFC(8,8)	0
62	49-54	F6.0	REQFC(9,8)	0
62	55-60	F6.0	REQFC(10,8)	0
62	61-66	F6.0	REQFC(11,8)	0
62	67-72	F6.0	REQFC(12,8)	0
63	1-6	F6.0	REQFC(1,9)	1638
63	7-12	F6.0	REQFC(2,9)	0
63	13-18	F6.0	REQFC(3,9)	0
63	19-24	F6.0	REQFC(4,9)	0
63	25-30	F6.0	REQFC(5,9)	0
63	31-36	F6.0	REQFC(6,9)	0
63	37-42	F6.0	REQFC(7,9)	0
63	43-48	F6.0	REQFC(8,9)	0
63	49-54	F6.0	REQFC(9,9)	0
63	55-60	F6.0	REQFC(10,9)	0
63	61-66	F6.0	REQFC(11,9)	0
63	67-72	F6.0	REQFC(12,9)	0
64	1-6	F6.0	REQFC(1,10)	0
64	7-12	F6.0	REQFC(2,10)	0
64	13-18	F6.0	REQFC(3,10)	0

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
64	19-24	F6.0	REQFC(4,10)	0
64	25-30	F6.0	REQFC(5,10)	0
64	31-36	F6.0	REQFC(6,10)	0
64	37-42	F6.0	REQFC(7,10)	0
64	43-48	F6.0	REQFC(8,10)	0
64	49-54	F6.0	REQFC(9,10)	0
64	55-60	F6.0	REQFC(10,10)	0
64	61-66	F6.0	REQFC(11,10)	0
64	67-72	F6.0	REQFC(12,10)	0
65	1-6	F6.0	REQFC(1,11)	688
65	7-12	F6.0	REQFC(2,11)	0
65	13-18	F6.0	REQFC(3,11)	0
65	18-24	F6.0	REQFC(4,11)	0
65	25-30	F6.0	REQFC(5,11)	0
65	31-36	F6.0	REQFC(6,11)	0
65	37-42	F6.0	REQFC(7,11)	0
65	43-48	F6.0	REQFC(8,11)	0
65	49-54	F6.0	REQFC(9,11)	0
65	55-60	F6.0	REQFC(10,11)	0
65	61-66	F6.0	REQFC(11,11)	0
65	67-72	F6.0	REQFC(12,11)	0
66	1-6	F6.0	REQFC(1,12)	62
66	7-12	F6.0	REQFC(2,12)	0
66	13-18	F6.0	REQFC(3,12)	0
66	19-24	F6.0	REQFC(4,12)	0

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
66	25-30	F6.0	REQFC(5,12)	0
66	31-36	F6.0	REQFC(6,12)	0
66	37-42	F6.0	REQFC(7,12)	0
66	43-48	F6.0	REQFC(8,12)	0
66	49-54	F6.0	REQFC(9,12)	0
66	55-60	F6.0	REQFC(10,12)	0
66	61-66	F6.0	REQFC(11,12)	0
66	67-72	F6.0	REQFC(12,12)	0
67	1-6	F6.0	REQFC(1,13)	620
67	7-12	F6.0	REQFC(2,13)	0
67	13-18	F6.0	REQFC(3,13)	0
67	19-24	F6.0	REQFC(4,13)	0
67	25-30	F6.0	REQFC(5,13)	0
67	31-36	F6.0	REQFC(6,13)	0
67	37-42	F6.0	REQFC(7,13)	0
67	43-48	F6.0	REQFC(8,13)	0
67	49-54	F6.0	REQFC(9,13)	0
67	55-60	F6.0	REQFC(10,13)	0
67	61-66	F6.0	REQFC(11,13)	0
67	67-72	F6.0	REQFC(12,13)	0
68	1-6	F6.0	REQFC(1,14)	935
68	7-12	F6.0	REQFC(2,14)	0
68	13-18	F6.0	REQFC(3,14)	0
68	19-24	F6.0	REQFC(4,14)	0
68	25-30	F6.0	REQFC(5,14)	0
68	31-36	F6.0	REQFC(6,14)	0
68	37-42	F6.0	REQFC(7,14)	0

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
68	43-48	F6.0	REQFC(8,14)	0
68	49-54	F6.0	REQFC(9,14)	0
68	55-60	F6.0	REQFC(10,14)	0
68	61-66	F6.0	REQFC(11,14)	0
68	67-72	F6.0	REQFC(12,14)	0
69	1-6	F6.0	REQFC(1,15)	0
69	7-12	F6.0	REQFC(2,15)	0
69	13-18	F6.0	REQFC(3,15)	0
69	19-24	F6.0	REQFC(4,15)	0
69	25-30	F6.0	REQFC(5,15)	0
69	31-36	F6.0	REQFC(6,15)	0
69	37-42	F6.0	REQFC(7,15)	0
69	43-48	F6.0	REQFC(8,15)	200
69	49-54	F6.0	REQFC(9,15)	100
69	55-60	F6.0	REQFC(10,15)	0
69	61-66	F6.0	REQFC(11,15)	0
69	67-72	F6.0	REQFC(12,15)	0
70	1-4	F4.1	PCINT1(1)	6.0
70	5-8	F4.1	PCINT2(1)	6.0
70	9-10	I2	MONCOR(1)	1
70	11-13	I3	IPERIO(1)	20
70	14-16	I3	IGRACE(1)	3
70	17-21	F5.0	AMTPHA(1)	46273
70	22-24	F3.0	HAFIME(1)	1
70	25-27	F3.0	HAFISD(1)	0
70	28-30	I3	IBEGYR(1)	1

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
70	31-33	I3	IENDYR(1)	999
71	1-4	F4.1	PCINT1(2)	7.0
71	5-8	F4.1	PCINT2(2)	12.0
71	9-10	I2	MONCOR(2)	1
71	11-13	I3	IPERIO(2)	8
71	14-16	I3	IGRACE(2)	3
71	17-21	F5.0	AMTPHA(2)	1037
71	22-24	F3.0	HAFIME(2)	6
71	25-27	F3.0	HAFISD(2)	0
71	28-30	I3	IBEGYR(2)	1
71	31-33	I3	IENDYR(2)	3
72	1-4	F4.1	PCINT2(3)	10.0
72	5-8	F4.1	PCINT2(3)	13.0
72	9-10	I2	MONCOR(3)	1
72	11-13	I3	IPERIO(3)	1
72	14-16	I3	IGRACE(3)	0
72	17-21	F5.0	AMTPHA(3)	450
72	22-24	F3.0	HAFIME(3)	6
72	25-27	F3.0	HAFISD(3)	0
72	28-30	I3	IBEGYR(3)	4
72	31-33	I3	IENDYR(3)	999
73	1-4	F4.1	PCINT1(4)	6.0
73	5-8	F4.1	PCINT2(4)	6.0
73	9-10	I2	MONCOR(4)	1
73	11-13	I3	IPERIO(4)	4
73	14-16	I3	IGRACE(4)	1
73	17-21	F5.0	AMTPHA(4)	7744.

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
73	22-24	F3.0	HAFIME(4)	1
73	25-27	F3.0	HAFISD(4)	0
73	28-30	I3	IBEGYR(4)	1
73	31-33	I3	IENDYR(4)	999
74	1-4	F4.1	PCINTI(5)	7.0
74	5-8	F4.1	PCINT2(5)	12.0
74	9-10	I2	MONCOR(5)	1
74	11-13	I3	IPERIO(5)	8
74	14-16	I3	IGRACE(5)	3
74	17-21	F5.0	AMTPHA(5)	7588
74	22-24	F3.0	HAFIME(5)	1
74	25-27	F3.0	HAFISD(5)	0
74	28-30	I3	IBEGYR(5)	1
74	31-33	I3	IENDYR(5)	999
75	1-4	F4.1	PCINTI(6)	6.0
75	5-8	F4.1	PCINT2(6)	6.0
75	9-10	I2	MONCOR(6)	1
75	11-13	I3	IPERIO(6)	1
75	14-16	I3	IGRACE(6)	0
75	17-21	F5.0	AMTPHA(6)	202
75	22-24	F3.0	HAFIME(6)	3
75	25-27	F3.0	HAFISD(6)	0
75	28-30	I3	IBEGYR(6)	1
75	31-33	I3	IENDYR(6)	4
76	1-4	F4.1	PCINTI(7)	10.0
76	5-8	F4.1	PCINT2(7)	13.0
76	9-10	I2	MONCOR(7)	1
76	11-13	I3	IPERIO(7)	1
76	14-16	I3	IGRACE(7)	0
76	17-21	F5.0	AMTPHA(7)	430

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
76	22-24	F3.0	HAFIME(7)	3
76	25-27	F3.0	HAFISD(7)	0
76	28-30	I3	IBEGYR(7)	1
76	31-33	I3	IENDYR(7)	999
77	1-4	F4.1	PCINTI(8)	10.0
77	5-8	F4.1	PCINT2(8)	13.0
77	9-10	I2	MONCOR(8)	1
77	11-13	I3	IPERIO(8)	1
77	14-16	I3	IGRACE(8)	0
77	17-21	F5.0	AMTPHA(8)	190
77	22-24	F3.0	HAFIME(8)	3
77	25-27	F3.0	HAFISD(8)	0
77	28-30	I3	IBEGYR(8)	1
77	31-33	I3	IENDYR(8)	3
78	1-4	F4.1	PCINTI(9)	10.0
78	5-8	F4.1	PCINT2(9)	13.0
78	9-10	I2	MONCOR(9)	1
78	11-13	I3	IPERIO(9)	1
78	14-16	I3	IGRACE(9)	0
78	17-21	F5.0	AMTPHA(9)	340
78	22-24	F3.0	HAFIME(9)	2
78	25-27	F3.0	HAFISD(9)	0
78	28-30	I3	IBEGYR(9)	1
78	31-33	I3	IENDYR(9)	3
79	1-4	F4.1	PCINTI(10)	10.0
79	5-8	F4.1	PCINT2(10)	13.0
79	9-10	I2	MONCOR(10)	1
79	11-13	I3	IPERIO(10)	8
79	14-16	I3	IGRACE(10)	3
79	17-21	F5.0	AMTPHA(10)	8748
79	22-24	F3.0	HAFIME(10)	2

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
79	25-27	F3.0	HAFISD(10)	0
79	28-30	I3	IBEGYR(10)	1
79	3=-33	I3	IENDYR(10)	999
80	1-4	F4.1	PCINT1(11)	10.0
80	4-8	F4.1	PCINT2(11)	13.0
80	9-10	I2	MONCOR(11)	1
80	11-13	I3	IPERIO(11)	8
80	14-16	I3	IGRACE(11)	3
80	17-21	F5.0	AMTPHA(11)	1156
80	22-24	F3.0	HAFIME(11)	5
80	25-27	F3.0	HAFISD(11)	0
80	28-30	I3	IBEGYR(11)	1
80	31-33	I3	IENDYR(11)	999
81	1-4	F4.1	PCINT1(12)	0.0
81	5-8	F4.1	PCINT2(12)	0.0
81	9-10	I2	MONCOR(12)	1
81	11-13	I3	IPERIO(12)	1
81	14-16	I3	IGRACE(12)	0
81	17-21	F5.0	AMTPHA(12)	1000
81	22-24	F3.0	HAFIME(12)	1
81	25-27	F3.0	HAFISD(12)	0
81	28-30	I3	IBEGYR(12)	1
81	31-33	I3	IENDYR(12)	999
82	1-5	F5.3	RAINFL	0.350
82	6-8	I3	MAXNLO	20
83	1-5	F5.2	PRFIN(1)	1.00
83	6-10	F5.2	PRFIN(2)	0.79

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
83	11-15	F5.2	PRFIN(3).	0.74
83	16-20	F5.2	PRFIN(4)	1.00
83	21-25	F5.2	PRFIN(5)	0.12
83	26-30	F5.2	PRFIN(6)	1.00
83	31-35	F5.2	PRFIN(7)	0.73
83	36-40	F5.2	PRFIN(8)	0.67
83	41-45	F5.2	PRFIN(9)	0.57
83	46-50	F5.2	PRFIN(10)	0.50
83	51-55	F5.2	PRFIN(11)	0.05
83	56-60	F5.2	PRFIN(12)	0.10
84	1-5	F5.2	ESPOIL(1)	0.18
84	6-10	F5.2	SPOIME(1)	0.18
84	11-15	F5.2	SPOISD(1)	0.25
84	16-20	F5.2	SPOSME(1)	0.10
84	21-25	F5.2	SPOSSD(1)	0.17
85	1-5	F5.2	ESPOIL(2)	0.28
85	6-10	F5.2	SPOIME(2)	0.28
85	11-15	F5.2	SPOISD(2)	0.29
85	16-20	F5.2	SPOSME(2)	0.00
85	21-25	F5.2	SPOSSD(2)	0.00
86	1-5	F5.2	ESPOIL(3)	0.06
86	6-10	F5.2	SPOIME(3)	0.05
86	11-15	F5.2	SPOISD(3)	0.09
86	16-20	F5.2	SPOSME(3)	0.00
86	21-25	F5.2	SPOSSD(3)	0.00
87	1-5	F5.2	ESPOIL(4)	0.00
87	6-10	F5.2	SPOIME(4)	0.00

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
87	11-15	F5.2	SPOISD(4)	0.00
87	16-20	F5.2	SPOSME(4)	0.00
87	21-25	F5.2	SPOSSD(4)	0.00
88	1-5	F5.2	ESPOIL(5)	0.00
88	6-10	F5.2	SPOIME(5)	0.00
88	11-15	F5.2	SPOISD(5)	0.00
88	16-20	F5.2	SPOSME(5)	0.00
88	21-25	F5.2	SPOSSD(5)	0.00
89	1-5	F5.2	ESPOIL(6)	0.00
89	6-10	F5.2	SPOIME(6)	0.00
89	11-15	F5.2	SPOISD(6)	0.00
89	16-20	F5.2	SPOSME(6)	0.00
89	21-25	F5.2	SPOSSD(6)	0.00
90	1-5	F5.2	ESPOIL(7)	0.00
90	6-10	F5.2	SPOIME(7)	0.00
90	11-15	F5.2	SPOISD(7)	0.00
90	16-20	F5.2	SPOSME(7)	0.00
90	21-25	F5.2	SPOSSD(7)	0.00
91	1-5	F5.2	ESPOIL(8)	0.00
91	6-10	F5.2	SPOIME(8)	0.00
91	11-15	F5.2	SPOISD(8)	0.00
91	16-20	F5.2	SPOSME(8)	0.00
91	21-25	F5.2	SPOSSD(8)	0.00
92	1-5	F5.2	ESPOIL(9)	0.00
92	6-10	F5.2	SPOIME(9)	0.00
92	11-15	F5.2	SPOISD(9)	0.00
92	16-20	F5.2	SPOSME(9)	0.00
92	21-25	F5.2	SPOSSD(9)	0.00

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
93	1-5	F5.2	ESPOIL(10)	0.00
93	6-10	F5.2	SPOIME(10)	0.00
93	11-15	F5.2	SPOISD(10)	0.00
93	16-20	F5.2	SPOSME(10)	0.00
93	21-25	F5.2	SPOSSD(10)	0.00
94	1-5	F5.2	PHUNT	0.07
94	6-10	I5	IENDHU	15
94	11-16	F6.2	YLDSLO	-0.68
94	17-22	F6.2	YLDINT	14.13
94	23-28	F6.2	EFFSLO	-2.00
94	29-34	F6.2	EFFINT	84.00
95	1-6	F6.3	EFFORT(1)	0.026
95	7-12	F6.3	EFFORT(2)	0.082
95	13-18	F6.3	EFFORT(3)	0.084
95	19-24	F6.3	EFFORT(4)	0.148
95	25-30	F6.3	EFFORT(5)	0.104
95	31-36	F6.3	EFFORT(6)	0.108
95	37-42	F6.3	EFFORT(7)	0.124
95	43-48	F6.3	EFFORT(8)	0.136
95	49-54	F6.3	EFFORT(9)	0.016
95	55-60	F6.3	EFFORT(10)	0.014
95	61-66	F6.3	EFFORT(11)	0.072
95	67-72	F6.3	EFFORT(12)	0.086
96	1-5	F5.2	GWASTE	0.40
97	1-5	F5.2	PRNOTR(1,1)	0.00
97	6-10	F5.2	PRNOTR(1,2)	0.00
97	11-15	F5.2	PRNOTR(2,1)	0.16

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
97	16-20	F5.2	PRNOTR(2,2)	0.00
97	21-25	F5.2	PRNOTR(3,1)	1.00
97	26-30	F5.2	PRNOTR(3,2)	0.23
97	31-33	I3	IYRTPT	4
97	34-38	F5.2	PRZONE(1)	0.26
97	39-43	F5.2	PRZONE(2)	0.40
97	44-48	F5.2	PRZONE(3)	0.34
98	1-5	F5.2	PINFEC(1,1)	0.21
98	6-10	F5.2	PINFEC(2,1)	0.29
98	11-15	F5.2	PINFEC(1,2)	0.03
98	16-20	F5.2	PINFEC(2,2)	0.13
98	21-25	F5.2	PINFEC(1,3)	0.11
98	26-30	F5.2	PINFEC(2,3)	0.29
98	31-34	I4	LSPORE(1)	999
98	35-38	I4	LSPORE(2)	999
98	39-42	I4	LSPORE(3)	999
98	43-47	F5.2	PRDIES(1)	0.21
98	48-52	F5.2	PRDIES(2)	0.29
98	53-57	F5.2	PRDIES(3)	0.00
98	58-62	F5.2	BPMULT	0.45
98	63-67	F5.2	WBMULT	0.50
98	68-72	F5.2	FUMULT	0.50
99	1-7	F7.2	FAMSTR(1,1)	37.03
99	8-14	F7.2	FAMSTR(1,2)	37.03
100	1-7	F7.2	FAMSTR(2,1)	10.78
100	8-14	F7.2	FAMSTR(2,2)	10.78
101	1-7	F7.4	FAMSTR(3,1)	0.9120
101	8-14	F7.4	FAMSTR(3,2)	0.9470

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
102	1-7	F7.4	FAMSTR(4,1)	0.1820
102	8-14	F7.4	FAMSTR(4,2)	0.0000
103	1-7	F7.4	FAMSTR(5,1)	0.8980
103	8-14	F7.4	FAMSTR(5,2)	0.9500
104	1-7	F7.2	FAMSTR(6,1)	31.87
104	8-14	F7.2	FAMSTR(6,2)	31.87
105	1-7	F7.2	FAMSTR(7,1)	10.67
105	8-14	F7.2	FAMSTR(7,2)	10.67
106	1-7	F7.2	FAMSTR(8,1)	0.53
106	8-14	F7.2	FAMSTR(8,2)	0.53
107	1-7	F7.2	FAMSTR(9,1)	4.14
107	8-14	F7.2	FAMSTR(9,2)	4.14
108	1-7	F7.2	FAMSTR(10,1)	2.27
108	8-14	F7.2	FAMSTR(10,2)	2.27
109	1-6	F6.1	DALOME(1)	33.3
109	7-12	F6.1	DALOSD(1)	23.1
109	13-18	F6.1	DALOME(2)	86.7
109	19-24	F6.1	DALOSD(2)	79.0
109	25-30	F6.1	DALOME(3)	45.0
109	31-36	F6.1	DALOSD(3)	30.0
110	1-7	F7.4	PDISEA(1,1,1)	0.0227
110	8-14	F7.4	PDISEA(1,1,2)	0.0185
110	15-21	F7.4	PDISEA(1,1,3)	0.0103
110	22-28	F7.4	PDISEA(1,1,4)	0.0214
110	29-35	F7.4	PDISEA(1,1,5)	0.0198
110	36-42	F7.4	PDISEA(1,1,6)	0.0138
110	43-49	F7.4	PDISEA(1,1,7)	0.0175

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
111	1-7	F7.4	PDISEA(1,1,8)	0.0130
111	8-14	F7.4	PDISEA(1,1,9)	0.0144
111	15-21	F7.4	PDISEA(1,1,10)	0.0072
111	22-28	F7.4	PDISEA(1,1,11)	0.0248
111	29-35	F7.4	PDISEA(1,1,12)	0.0248
111	36-42	F7.4	PDISEA(1,1,13)	0.0165
112	1-7	F7.4	PDISEA(1,2,1)	0.0140
112	8-14	F7.4	PDISEA(1,2,2)	0.0098
112	15-21	F7.4	PDISEA(1,2,3)	0.0038
112	22-28	F7.4	PDISEA(1,2,4)	0.0090
112	29-35	F7.4	PDISEA(1,2,5)	0.0116
112	36-42	F7.4	PDISEA(1,2,6)	0.0191
112	43-49	F7.4	PDISEA(1,2,7)	0.0176
113	1-7	F7.4	PDISEA(1,2,8)	0.0196
113	8-14	F7.4	PDISEA(1,2,9)	0.0025
113	15-21	F7.4	PDISEA(1,2,10)	0.0165
113	22-28	F7.4	PDISEA(1,2,11)	0.0248
113	29-35	F7.4	PDISEA(1,2,12)	0.0062
113	36-42	F7.4	PDISEA(1,2,13)	0.0248
114	1-7	F7.4	PDISEA(2,1,1)	0.0027
114	8-14	F7.4	PDISEA(2,1,2)	0.0021
114	15-21	F7.4	PDISEA(2,1,3)	0.0033
114	22-28	F7.4	PDISEA(2,1,4)	0.0062
114	29-35	F7.4	PDISEA(2,1,5)	0.0084
114	36-42	F7.4	PDISEA(2,1,6)	0.0053
114	43-49	F7.4	PDISEA(2,1,7)	0.0095
115	1-7	F7.4	PDISEA(2,1,8)	0.0065
115	8-14	F7.4	PDISEA(2,1,9)	0.0058

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
115	15-21	F7.4	PDISEA(2,1,10)	0.0046
115	22-28	F7.4	PDISEA(2,1,11)	0.0038
115	29-35	F7.4	PDISEA(2,1,12)	0.0248
115	36-42	F7.4	PDISEA(2,1,13)	0.0414
116	1-7	F7.4	PDISEA(2,2,1)	0.0016
116	8-14	F7.4	PDISEA(2,2,2)	0.0009
116	15-21	F7.4	PDISEA(2,2,3)	0.0005
116	22-28	F7.4	PDISEA(2,2,4)	0.0011
116	29-35	F7.4	PDISEA(2,2,5)	0.0011
116	36-42	F7.4	PDISEA(2,2,6)	0.0006
116	43-49	F7.4	PDISEA(2,2,7)	0.0021
117	1-7	F7.4	PDISEA(2,2,8)	0.0039
117	8-14	F7.4	PDISEA(2,2,9)	0.0012
117	15-21	F7.4	PDISEA(2,2,10)	0.0033
117	22-28	F7.4	PDISEA(2,2,11)	0.0000
117	29-35	F7.4	PDISEA(2,2,12)	0.0062
117	36-42	F7.4	PDISEA(2,2,13)	0.0000
118	1-7	F7.4	PDISEA(3,1,1)	0.0405
118	8-14	F7.4	PDISEA(3,1,2)	0.0058
118	14-21	F7.4	PDISEA(3,1,3)	0.0018
118	22-28	F7.4	PDISEA(3,1,4)	0.0021
118	29-35	F7.4	PDISEA(3,1,5)	0.0038
118	36-42	F7.4	PDISEA(3,1,6)	0.0024
118	43-49	F7.4	PDISEA(3,1,7)	0.0009
119	1-7	F7.4	PDISEA(3,1,8)	0.0059
119	8-14	F7.4	PDISEA(3,1,9)	0.0023
119	15-21	F7.4	PDISEA(3,1,10)	0.0033

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
119	22-28	F7.4	PDISEA(3,1,11)	0.0019
119	29-35	F7.4	PDISEA(3,1,12)	0.0331
119	36-42	F7.4	PDISEA(3,1,13)	0.0083
120	1-7	F7.4	PDISEA(3,2,1)	0.0260
120	8-14	F7.4	PDISEA(3,2,2)	0.0021
120	15-21	F7.4	PDISEA(3,2,3)	0.0016
120	22-28	F7.4	PDISEA(3,2,4)	0.0005
120	29-35	F7.4	PDISEA(3,2,5)	0.0011
120	36-42	F7.4	PDISEA(3,2,6)	0.0032
120	43-49	F7.4	PDISEA(3,2,7)	0.0021
121	1-7	F7.4	PDISEA(3,2,8)	0.0065
121	8-14	F7.4	PDISEA(3,2,9)	0.0037
121	15-21	F7.4	PDISEA(3,2,10)	0.0033
121	22-28	F7.4	PDISEA(3,2,11)	0.0000
121	29-35	F7.4	PDISEA(3,2,12)	0.0062
121	36-42	F7.4	PDISEA(3,2,13)	0.0124
122	1-6	F6.3	PDISMO(1,1)	0.061
122	7-12	F6.3	PDISMO(1,2)	0.083
122	13-18	F6.3	PDISMO(1,3)	0.126
122	19-24	F6.3	PDISMO(1,4)	0.067
122	25-30	F6.3	PDISMO(1,5)	0.056
122	31-36	F6.3	PDISMO(1,6)	0.051
123	1-6	F6.3	PDISMO(1,7)	0.067
123	7-12	F6.3	PDISMO(1,8)	0.104
123	13-18	F6.3	PDISMO(1,9)	0.155
123	19-24	F6.3	PDISMO(1,10)	0.092
123	25-30	F6.3	PDISMO(1,11)	0.081

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
123	31-36	F6.3	PDISMO(1,12)	0.057
124	1-6	F6.3	PDISMO(2,1)	0.051
124	7-12	F6.3	PDISMO(2,2)	0.080
124	13-18	F6.3	PDISMO(2,3)	0.048
124	19-24	F6.3	PDISMO(2,4)	0.070
124	25-30	F6.3	PDISMO(2,5)	0.090
124	31-36	F6.3	PDISMO(2,6)	0.049
125	1-6	F6.3	PDISMO(2,7)	0.079
125	7-12	F6.3	PDISMO(2,8)	0.103
125	13-18	F6.3	PDISMO(2,9)	0.081
125	19-24	F6.3	PDISMO(2,10)	0.103
125	25-30	F6.3	PDISMO(2,11)	0.141
125	31-36	F6.3	PDISMO(2,12)	0.105
126	1-6	F6.3	PDISMO(3,1)	0.083
126	7-12	F6.3	PDISMO(3,2)	0.084
126	13-18	F6.3	PDISMO(3,3)	0.083
126	19-24	F6.3	PDISMO(3,4)	0.083
126	25-30	F6.3	PDISMO(3,5)	0.084
126	31-36	F6.3	PDISMO(3,6)	0.083
127	1-6	F6.3	PDISMO(3,7)	0.084
127	7-12	F6.3	PDISMO(3,8)	0.083
127	13-18	F6.3	PDISMO(3,9)	0.083
127	19-24	F6.3	PDISMO(3,10)	0.084
127	25-30	F6.3	PDISMO(3,11)	0.083
127	31-36	F6.3	PDISMO(3,12)	0.083
128	1-6	F6.3	PDEP(1,1)	0.077
128	7-12	F6.3	PDEP(1,2)	0.077

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
129	1-6	F6.3	PDEP(2,1)	0.074
129	7-12	F6.3	PDEP(2,2)	0.074
130	1-6	F6.3	PDEP(3,1)	0.064
130	7-12	F6.3	PDEP(3,2)	0.064
131	1-6	F6.3	PDEP(4,1)	0.065
131	7-12	F6.3	PDEP(4,2)	0.065
132	1-6	F6.3	PDEP(5,1)	0.052
132	7-12	F6.3	PDEP(5,2)	0.052
133	1-6	F6.3	PDEP(6,1)	0.052
133	7-12	F6.3	PDEP(6,2)	0.052
134	1-6	F6.3	PDEP(7,1)	0.055
134	7-12	F6.3	PDEP(7,2)	0.055
135	1-6	F6.3	PDEP(8,1)	0.036
135	7-12	F6.3	PDEP(8,2)	0.036
136	1-6	F6.3	PDEP(9,1)	0.039
136	7-12	F6.3	PDEP(9,2)	0.039
137	1-6	F6.3	PDEP(10,1)	0.052
137	7-12	F6.3	PDEP(10,2)	0.052
138	1-6	F6.3	PDEP(11,1)	0.061
138	7-12	F6.3	PDEP(11,2)	0.061
139	1-6	F6.3	PDEP(12,1)	0.055
139	7-12	F6.3	PDEP(12,2)	0.055
140	1-6	F6.3	PDEP(13,1)	0.039
140	7-12	F6.3	PDEP(13,2)	0.039
141	1-6	F6.3	PDEP(14,1)	0.047
141	7-12	F6.3	PDEP(14,2)	0.047
142	1-6	F6.3	PDEP(15,1)	0.017
142	7-12	F6.3	PDEP(15,2)	0.017

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
143	1-6	F6.3	PDEP(16,1)	0.025
143	7-12	F6.3	PDEP(16,2)	0.025
144	1-6	F6.3	PDEP(17,1)	0.036
144	7-12	F6.3	PDEP(17,2)	0.036
145	1-6	F6.3	PDEP(18,1)	0.028
145	7-12	F6.3	PDEP(18,2)	0.028
146	1-6	F6.3	PDEP(19,1)	0.011
146	7-12	F6.3	PDEP(19,2)	0.011
147	1-6	F6.3	PDEP(20,1)	0.022
147	7-12	F6.3	PDEP(20,2)	0.022
148	1-6	F6.3	PDEP(21,1)	0.017
148	7-12	F6.3	PDEP(21,2)	0.017
149	1-6	F6.3	PDEP(22,1)	0.014
149	7-12	F6.3	PDEP(22,2)	0.014
150	1-6	F6.3	PDEP(23,1)	0.008
150	7-12	F6.3	PDEP(23,2)	0.008
151	1-6	F6.3	PDEP(24,1)	0.014
151	7-12	F6.3	PDEP(24,2)	0.014
152	1-6	F6.3	PDEP(25,1)	0.003
152	7-12	F6.3	PDEP(25,2)	0.003
153	1-6	F6.3	PDEP(26,1)	0.008
153	7-12	F6.3	PDEP(26,2)	0.008
154	1-6	F6.3	PDEP(27,1)	0.000
154	7-12	F6.3	PDEP(27,2)	0.000
155	1-6	F6.3	PDEP(28,1)	0.000
155	7-12	F6.3	PDEP(28,2)	0.000

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
156	1-6	F6.3	PDEP(29,1)	0.006
156	7-12	F6.3	PDEP(29,2)	0.006
157	1-6	F6.3	PDEP(30,1)	0.003
157	7-12	F6.3	PDEP(30,2)	0.003
158	1-6	F6.3	PDEP(31,1)	0.000
158	7-12	F6.3	PDEP(31,2)	0.000
159	1-6	F6.3	PDEP(32,1)	0.000
159	7-12	F6.3	PDEP(32,2)	0.000
160	1-6	F6.3	PDEP(33,1)	0.003
160	7-12	F6.3	PDEP(33,2)	0.003
161	1-6	F6.3	PDEP(34,1)	0.000
161	7-12	F6.3	PDEP(34,2)	0.000
162	1-6	F6.3	PDEP(35,1)	0.000
162	7-12	F6.3	PDEP(35,2)	0.000
163	1-6	F6.3	PDEP(36,1)	0.000
163	7-12	F6.3	PDEP(36,2)	0.000
164	1-6	F6.3	PDEP(37,1)	0.000
164	7-12	F6.3	PDEP(37,2)	0.000
165	1-6	F6.3	PDEP(38,1)	0.000
165	7-12	F6.3	PDEP(38,2)	0.000
166	1-6	F6.3	PDEP(39,1)	0.000
166	7-12	F6.3	PDEP(39,2)	0.000
167	1-6	F6.3	PDEP(40,1)	0.000
167	7-12	F6.3	PDEP(40,2)	0.000
168	1-6	F6.3	PDEP(41,1)	0.000
168	7-12	F6.3	PDEP(41,2)	0.000
169	1-6	F6.3	PDEP(42,1)	0.000
169	7-12	F6.3	PDEP(42,2)	0.000

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
170	1-6	F6.3	PDEP(43,1)	0.000
170	7-12	F6.3	PDEP(43,2)	0.000
171	1-6	F6.3	PDEP(44,1)	0.000
171	7-12	F6.3	PDEP(44,2)	0.000
172	1-6	F6.3	PDEP(45,1)	0.000
172	7-12	F6.3	PDEP(45,2)	0.000
173	1-6	F6.3	PDEP(46,1)	0.000
173	7-12	F6.3	PDEP(46,2)	0.000
174	1-6	F6.3	PDEP(47,1)	0.000
174	7-12	F6.3	PDEP(47,2)	0.000
175	1-6	F6.3	PDEP(48,1)	0.000
175	7-12	F6.3	PDEP(48,2)	0.000
176	1-6	F6.3	PDEP(49,1)	0.000
176	7-12	F6.3	PDEP(49,2)	0.000
177	1-6	F6.3	PDEP(50,1)	0.000
177	7-12	F6.3	PDEP(50,2)	0.000
178	1-6	F6.3	PDEP(51,1)	0.000
178	7-12	F6.3	PDEP(51,2)	0.000
179	1-6	F6.3	PDEP(52,1)	0.000
179	7-12	F6.3	PDEP(52,2)	0.000
180	1-6	F6.3	PDEP(53,1)	0.000
180	7-12	F6.3	PDEP(53,2)	0.000
181	1-6	F6.3	PDEP(54,1)	0.000
181	7-12	F6.3	PDEP(54,2)	0.000
182	1-6	F6.3	PDEP(55,1)	0.000
182	7-12	F6.3	PDEP(55,2)	0.000
183	1-6	F6.3	PDEP(56,1)	0.000
183	7-12	F6.3	PDEP(56,2)	0.000

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
184	1-6	F6.3	PDEP(57,1)	0.000
184	7-12	F6.3	PDEP(57,2)	0.000
185	1-6	F6.3	PDEP(58,1)	0.000
185	7-12	F6.3	PDEP(58,2)	0.000
186	1-6	F6.3	PDEP(59,1)	0.000
186	7-12	F6.3	PDEP(59,2)	0.000
187	1-6	F6.3	PDEP(60,1)	0.000
187	7-12	F6.3	PDEP(60,2)	0.000
188	1-6	F6.3	PDEP(61,1)	0.000
188	7-12	F6.3	PDEP(61,2)	0.000
189	1-6	F6.3	PDEP(62,1)	0.003
189	7-12	F6.3	PDEP(62,2)	0.003
190	1-6	F6.3	PDEP(63,1)	0.000
190	7-12	F6.3	PDEP(63,2)	0.000
191	1-6	F6.3	PDEP(64,1)	0.000
191	7-12	F6.3	PDEP(64,2)	0.000
192	1-6	F6.3	PDEP(65,1)	0.000
192	7-12	F6.3	PDEP(65,2)	0.000
193	1-6	F6.3	PDEP(66,1)	0.006
193	7-12	F6.3	PDEP(66,2)	0.006
194	1-6	F6.3	PDEP(67,1)	0.000
194	7-12	F6.3	PDEP(67,2)	0.000
195	1-6	F6.3	PDEP(68,1)	0.000
195	7-12	F6.3	PDEP(68,2)	0.000
196	1-6	F6.3	PDEP(69,1)	0.003
196	7-12	F6.3	PDEP(69,2)	0.003
197	1-6	F6.3	PDEP(70,1)	0.000
197	7-12	F6.3	PDEP(70,2)	0.000

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
198	1-6	F6.3	PDEP(71,1)	0.000
198	7-12	F6.3	PDEP(71,2)	0.000
199	1-6	F6.3	PDEP(72,1)	0.000
199	7-12	F6.3	PDEP(72,2)	0.000
200	1-6	F6.3	PDEP(73,1)	0.000
200	7-12	F6.3	PDEP(73,2)	0.000
201	1-6	F6.3	PDEP(74,1)	0.000
201	7-12	F6.3	PDEP(74,2)	0.000
202	1-6	F6.3	PDEP(75,1)	0.000
202	7-12	F6.3	PDEP(75,2)	0.000
203	1-6	F6.3	PDEP(76,1)	0.000
203	7-12	F6.3	PDEP(76,2)	0.000
204	1-6	F6.3	PDEP(77,1)	0.000
204	7-12	F6.3	PDEP(77,2)	0.000
205	1-6	F6.3	PDEP(78,1)	0.000
205	7-12	F6.3	PDEP(78,2)	0.000
206	1-6	F6.3	PDEP(79,1)	0.000
206	7-12	F6.3	PDEP(79,2)	0.000
207	1-6	F6.3	PDEP(80,1)	0.000
207	7-12	F6.3	PDEP(80,2)	0.000
208	1-6	F6.3	PDEP(81,1)	0.000
208	7-12	F6.3	PDEP(81,2)	0.000
209	1-6	F6.3	PDEP(82,1)	0.000
209	7-12	F6.3	PDEP(82,2)	0.000
210	1-6	F6.3	PDEP(83,1)	0.000
210	7-12	F6.3	PDEP(83,2)	0.000
211	1-6	F6.3	PDEP(84,1)	0.003
211	7-12	F6.3	PDEP(84,2)	0.003

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
212	1-6	F6.3	PDEP(85,1)	0.000
212	7-12	F6.3	PDEP(85,2)	0.000
213	1-6	F6.3	PDEP(86,1)	0.003
213	7-12	F6.3	PDEP(86,2)	0.003
214	1-5	F5.2	FLEQUI(1,1)	0.00
214	6-10	F5.2	FLEQUI(1,2)	0.20
214	11-15	F5.2	FLEQUI(1,3)	0.25
214	16-20	F5.2	FLEQUI(1,4)	0.50
214	21-25	F5.2	FLEQUI(1,5)	1.00
215	1-5	F5.2	FLEQUI(2,1)	0.00
215	6-10	F5.2	FLEQUI(2,2)	0.15
215	11-15	F5.2	FLEQUI(2,3)	0.20
215	16-20	F5.2	FLEQUI(2,4)	0.40
215	21-25	F5.2	FLEQUI(2,5)	0.75
216	1-7	F7.4	PDEATH(1,1)	0.0156
216	8-14	F7.4	PINDEM(1,1)	0.0000
216	15-21	F7.4	PDEATH(2,1)	0.0118
216	22-28	F7.4	PINDEM(2,1)	0.0000
217	1-7	F7.4	PDEATH(1,2)	0.0008
217	8-14	F7.4	PINDEM(1,2)	0.0000
217	15-21	F7.4	PDEATH(2,2)	0.0005
217	22-28	F7.4	PINDEM(2,2)	0.0000
218	1-7	F7.4	PDEATH(1,3)	0.0008
218	8-14	F7.4	PINDEM(1,3)	0.0000
218	15-21	F7.4	PDEATH(2,3)	0.0005
218	22-28	F7.4	PINDEM(2,3)	0.0000
219	1-7	F7.4	PDEATH(1,4)	0.0008

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
226	1-7	F7.4	PDEATH(1,11)	0.0004
226	8-14	F7.4	PINDEM(1,11)	0.0000
226	15-21	F7.4	PDEATH(2,11)	0.0003
226	22-28	F7.4	PINDEM(2,11)	0.0000
227	1-7	F7.4	PDEATH(1,12)	0.0004
227	8-14	F7.4	PINDEM(1,12)	0.0000
227	15-21	F7.4	PDEATH(2,12)	0.0003
227	22-28	F7.4	PINDEM(2,12)	0.0000
228	1-7	F7.4	PDEATH(1,13)	0.0004
228	8-14	F7.4	PINDEM(1,13)	0.0000
228	15-21	F7.4	PDEATH(2,13)	0.0003
228	22-28	F7.4	PINDEM(2,13)	0.0000
229	1-7	F7.4	PDEATH(1,14)	0.0004
229	8-14	F7.4	PINDEM(1,14)	0.0000
229	15-21	F7.4	PDEATH(2,14)	0.0003
229	22-28	F7.4	PINDEM(2,14)	0.0000
230	1-7	F7.4	PDEATH(1,15)	0.0004
230	8-14	F7.4	PINDEM(1,15)	0.0000
230	15-21	F7.4	PDEATH(2,15)	0.0003
230	22-28	F7.4	PINDEM(2,15)	0.0000
231	1-7	F7.4	PDEATH(1,16	0.0010
231	8-14	F7.4	PINDEM(1,16)	0.0000
231	15-21	F7.4	PDEATH(2,16)	0.0004
231	22-28	F7.4	PINDEM(2,16)	0.0000
232	1-7	F7.4	PDEATH(1,17)	0.0010
232	8-14	F7.4	PINDEM(1,17)	0.0000
232	15-21	F7.4	PDEATH(2,17)	0.0004
232	22-28	F7.4	PINDEM(2,17)	0.0000

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
233	1-7	F7.4	PDEATH(1,18)	0.0010
233	8-14	F7.4	PINDEM(1,18)	0.0303
233	15-21	F7.4	PDEATH(2,18)	0.0004
233	22-28	F7.4	PINDEM(2,18)	0.0345
234	1-7	F7.4	PDEATH(1,19)	0.0010
234	8-14	F7.4	PINDEM(1,19)	0.1034
234	15-21	F7.4	PDEATH(2,19)	0.0004
234	22-28	F7.4	PINDEM(2,19)	0.0000
235	1-7	F7.4	PDEATH(1,20)	0.0010
235	8-14	F7.4	PINDEM(2,20)	0.0625
235	15-21	F7.4	PDEATH(2,20)	0.0004
235	22-28	F7.4	PINDEM(2,20)	0.0000
236	1-7	F7.4	PDEATH(1,21)	0.0011
236	8-14	F7.4	PINDEM(1,21)	0.0768
236	15-21	F7.4	PDEATH(2,21)	0.0004
236	22-28	F7.4	PINDEM(2,21)	0.0000
237	1-7	F7.4	PDEATH(1,22)	0.0011
237	8-14	F7.4	PINDEM(1,22)	0.0968
237	15-21	F7.4	PDEATH(2,22)	0.0004
237	22-28	F7.4	PINDEM(2,22)	0.0714
238	1-7	F7.4	PDEATH(1,23)	0.0011
238	8-14	F7.4	PINDEM(1,23)	0.0590
238	15-21	F7.4	PDEATH(2,23)	0.0004
238	22-28	F7.4	PINDEM(2,23)	0.0000
239	1-7	F7.4	PDEATH(1,24)	0.0011
239	8-14	F7.4	PINDEM(1,24)	0.0385
239	15-21	F7.4	PDEATH(2,24)	0.0004

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
239	22-28	F7.4	PINDEM(2,24)	0.0000
240	1-7	F7.4	PDEATH(1,25)	0.0011
240	8-14	F7.4	PINDEM(1,25)	0.0000
240	15-21	F7.4	PDEATH(2,25)	0.0004
240	22-28	F7.4	PINDEM(2,25)	0.0000
241	1-7	F7.4	PDEATH(1,26)	0.0008
241	8-14	F7.4	PINDEM(1,26)	0.0000
241	15-21	F7.4	PDEATH(2,26)	0.0005
241	22-28	F7.4	PINDEM(2,26)	0.0000
242	1-7	F7.4	PDEATH(1,27)	0.0008
242	8-14	F7.4	PINDEM(1,27)	0.0000
242	15-21	F7.4	PDEATH(2,27)	0.0005
242	22-28	F7.4	PINDEM(2,27)	0.0000
243	1-7	F7.4	PDEATH(1,28)	0.0008
243	8-14	F7.4	PINDEM(1,28)	0.0000
243	15-21	F7.4	PDEATH(2,28)	0.0005
243	22-28	F7.4	PINDEM(2,28)	0.0000
244	1-7	F7.4	PDEATH(1,29)	0.0008
244	8-14	F7.4	PINDEM(1,29)	0.0000
244	15-21	F7.4	PDEATH(2,29)	0.0005
244	22-28	F7.4	PINDEM(2,29)	0.0000
245	1-7	F7.4	PDEATH(1,30)	0.0008
245	8-14	F7.4	PINDEM(1,30)	0.0000
245	15-21	F7.4	PDEATH(2,30)	0.0005
245	22-28	F7.4	PINDEM(2,30)	0.0000
246	1-7	F7.4	PDEATH(1,31)	0.0010
246	8-14	F7.4	PINDEM(1,31)	0.0435

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
246	15-21	F7.4	PDEATH(2,31)	0.0010
246	22-28	F7.4	PINDEM(2,31)	0.0000
247	1-7	F7.4	PDEATH(1,32)	0.0010
247	8-14	F7.4	PINDEM(1,32)	0.0000
247	15-21	F7.4	PDEATH(2,32)	0.0010
247	22-28	F7.4	PINDEM(2,32)	0.0435
248	1-7	F7.4	PDEATH(1,33)	0.0010
248	8-14	F7.4	PINDEM(1,33)	0.0000
248	15-21	F7.4	PDEATH(2,33)	0.0010
248	22-28	F7.4	PINDEM(2,33)	0.0000
249	1-7	F7.4	PDEATH(1,34)	0.0010
249	8-14	F7.4	PINDEM(1,34)	0.0000
249	15-21	F7.4	PDEATH(2,34)	0.0010
249	22-28	F7.4	PINDEM(2,34)	0.0000
250	1-7	F7.4	PDEATH(1,35)	0.0010
250	8-14	F7.4	PINDEM(1,35)	0.0000
250	15-21	F7.4	PDEATH(2,35)	0.0010
250	22-28	F7.4	PINDEM(2,35)	0.0000
251	1-7	F7.4	PDEATH(1,36)	0.0016
251	8-14	F7.4	PINDEM(1,36)	0.0000
251	15-21	F7.4	PDEATH(2,36)	0.0011
251	22-28	F7.4	PINDEM(2,36)	0.0000
252	1-7	F7.4	PDEATH(1,37)	0.0016
252	8-14	F7.4	PINDEM(1,37)	0.0000
252	15-21	F7.4	PDEATH(2,37)	0.0011
252	22-28	F7.4	PINDEM(2,37)	0.0000

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
253	1-7	F7.4	PDEATH(1,38)	0.0016
253	8-14	F7.4	PINDEM(1,38)	0.0000
253	15-21	F7.4	PDEATH(2,38)	0.0011
253	22-28	F7.4	PINDEM(2,38)	0.0000
254	1-7	F7.4	PDEATH(1,39)	0.0016
254	8-14	F7.4	PINDEM(1,39)	0.0000
254	15-21	F7.4	PDEATH(2,39)	0.0011
254	22-28	F7.4	PINDEM(2,39)	0.0000
255	1-7	F7.4	PDEATH(1,40)	0.0016
255	8-14	F7.4	PINDEM(1,40)	0.0000
255	15-21	F7.4	PDEATH(2,40)	0.0011
255	22-28	F7.4	PINDEM(2,40)	0.0000
256	1-7	F7.4	PDEATH(1,41)	0.0026
256	8-14	F7.4	PINDEM(1,41)	0.0000
256	15-21	F7.4	PDEATH(2,41)	0.0022
256	22-28	F7.4	PINDEM(2,41)	0.0000
257	1-7	F7.4	PDEATH(1,42)	0.0026
257	8-14	F7.4	PINDEM(1,42)	0.0000
257	15-21	F7.4	PDEATH(2,42)	0.0022
257	22-28	F7.4	PINDEM(2,42)	0.0000
258	1-7	F7.4	PDEATH(1,43)	0.0026
258	8-14	F7.4	PINDEM(1,43)	0.0000
258	15-21	F7.4	PDEATH(2,43)	0.0022
258	22-28	F7.4	PINDEM(2,43)	0.0000
259	1-7	F7.4	PDEATH(1,44)	0.0026
259	8-14	F7.4	PINDEM(1,44)	0.0000
259	15-21	F7.4	PDEATH(2,44)	0.0022

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
259	22-28	F7.4	PINDEM(2,44)	0.0000
260	1-7	F7.4	PDEATH(1,45)	0.0026
260	8-14	F7.4	PINDEM(1,45)	0.0000
260	15-21	F7.4	PDEATH(2,45)	0.0022
260	22-28	F7.4	PINDEM(2,45)	0.0000
261	1-7	F7.4	PDEATH(1,46)	0.0040
261	8-14	F7.4	PINDEM(1,46)	0.0000
261	15-21	F7.4	PDEATH(2,46)	0.0033
261	22-28	F7.4	PINDEM(2,46)	0.0000
262	1-7	F7.4	PDEATH(1,47)	0.0040
262	8-14	F7.4	PINDEM(1,47)	0.0000
262	15-21	F7.4	PDEATH(2,47)	0.0033
262	22-28	F7.4	PINDEM(2,47)	0.0000
263	1-7	F7.4	PDEATH(1,48)	0.0040
263	8-14	F7.4	PINDEM(1,48)	0.0714
263	15-21	F7.4	PDEATH(2,48)	0.0033
263	22-28	F7.4	PINDEM(2,48)	0.0000
264	1-7	F7.4	PDEATH(1,49)	0.0040
264	8-14	F7.4	PINDEM(1,49)	0.0000
264	15-21	F7.4	PDEATH(2,49)	0.0033
264	22-28	F7.4	PINDEM(2,49)	0.0000
265	1-7	F7.4	PDEATH(1,50)	0.0040
265	8-14	F7.4	PINDEM(1,50)	0.0909
265	15-21	F7.4	PDEATH(2,50)	0.0033
265	22-28	F7.4	PINDEM(2,50)	0.0000
266	1-7	F7.4	PDEATH(1,51)	0.0058
266	8-14	F7.4	PINDEM(1,51)	0.0000

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
266	15-21	F7.4	PDEATH(2,51)	0.0041
266	22-28	F7.4	PINDEM(2,51)	0.0000
267	1-7	F7.4	PDEATH(1,52)	0.0058
267	8-14	F7.4	PINDEM(1,52)	0.0000
267	15-21	F7.4	PDEATH(2,52)	0.0041
267	22-28	F7.4	PINDEM(2,52)	0.0000
268	1-7	F7.4	PDEATH(1,53)	0.0058
268	8-14	F7.4	PINDEM(1,53)	0.0000
268	15-21	F7.4	PDEATH(2,53)	0.0041
268	22-28	F7.4	PINDEM(2,53)	0.0000
269	1-7	F7.4	PDEATH(1,54)	0.0058
269	8-14	F7.4	PINDEM(1,54)	0.0000
269	15-21	F7.4	PDEATH(2,54)	0.0041
269	22-28	F7.4	PINDEM(2,54)	0.0000
270	1-7	F7.4	PDEATH(1,55)	0.0058
270	8-14	F7.4	PINDEM(1,55)	0.0000
270	15-21	F7.4	PDEATH(2,55)	0.0041
270	22-28	F7.4	PINDEM(2,55)	0.0000
271	1-7	F7.4	PDEATH(1,56)	0.0107
271	8-14	F7.4	PINDEM(1,56)	0.0000
271	15-21	F7.4	PDEATH(2,56)	0.0066
271	22-28	F7.4	PINDEM(2,56)	0.0000
272	1-7	F7.4	PDEATH(1,57)	0.0107
272	8-14	F7.4	PINDEM(1,57)	0.0000
272	15-21	F7.4	PDEATH(2,57)	0.0066
272	22-28	F7.4	PINDEM(2,57)	0.0000
273	1-7	F7.4	PDEATH(1,58)	0.0107

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
273	8-14	F7.4	PINDEM(1,58)	0.0000
273	15-21	F7.4	PDEATH(2,58)	0.0066
273	22-28	F7.4	PINDEM(2,58)	0.0000
274	1-7	F7.4	PDEATH(1,59)	0.0107
274	8-14	F7.4	PINDEM(1,59)	0.0000
274	15-21	F7.4	PDEATH(2,59)	0.0066
274	22-28	F7.4	PINDEM(2,59)	0.0000
275	1-7	F7.4	PDEATH(1,60)	0.0107
275	8-14	F7.4	PINDEM(1,60)	0.0000
275	15-21	F7.4	PDEATH(2,60)	0.0066
275	22-28	F7.4	PINDEM(2,60)	0.0000
276	1-7	F7.4	PDEATH(1,61)	0.0186
276	8-14	F7.4	PINDEM(1,61)	0.0000
276	15-21	F7.4	PDEATH(2,61)	0.0107
276	22-28	F7.4	PINDEM(2,61)	0.0000
277	1-7	F7.4	PDEATH(1,62)	0.0186
277	8-14	F7.4	PINDEM(1,62)	0.0000
277	15-21	F7.4	PDEATH(2,62)	0.0107
277	22-28	F7.4	PINDEM(2,62)	0.0000
278	1-7	F7.4	PDEATH(1,63)	0.0186
278	8-14	F7.4	PINDEM(1,63)	0.0000
278	15-21	F7.4	PDEATH(2,63)	0.0107
278	22-28	F7.4	PINDEM(2,63)	0.0000
279	1-7	F7.4	PDEATH(1,64)	0.0186
279	8-14	F7.4	PINDEM(1,64)	0.0000
279	15-21	F7.4	PDEATH(2,64)	0.0107
279	22-28	F7.4	PINDEM(2,64)	0.0000

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
280	1-7	F7.4	PDEATH(1,65)	0.0186
280	8-14	F7.4	PINDEM(1,65)	0.0000
280	15-21	F7.4	PDEATH(2,65)	0.0107
280	22-28	F7.4	PINDEM(2,65)	0.0000
281	1-7	F7.4	PDEATH(1,66)	0.0295
281	8-14	F7.4	PINDEM(1,66)	0.0000
281	15-21	F7.4	PDEATH(2,66)	0.0183
281	22-28	F7.4	PINDEM(2,66)	0.0000
282	1-7	F7.4	PDEATH(1,67)	0.0295
282	8-14	F7.4	PINDEM(1,67)	0.0000
282	15-21	F7.4	PDEATH(2,67)	0.0183
282	22-28	F7.4	PINDEM(2,67)	0.0000
283	1-7	F7.4	PDEATH(1,68)	0.0295
283	8-14	F7.4	PINDEM(1,68)	0.0000
283	15-21	F7.4	PDEATH(2,68)	0.0183
283	22-28	F7.4	PINDEM(2,68)	0.0000
284	1-7	F7.4	PDEATH(1,69)	0.0295
284	8-14	F7.4	PINDEM(1,69)	0.0000
284	15-21	F7.4	PDEATH(2,69)	0.0183
284	22-28	F7.4	PINDEM(2,69)	0.0000
285	1-7	F7.4	PDEATH(1,70)	0.0295
285	8-14	F7.4	PINDEM(1,70)	0.0000
285	15-21	F7.4	PDEATH(2,70)	0.0183
285	22-28	F7.4	PINDEM(2,70)	0.0000
286	1-7	F7.4	PDEATH(1,71)	0.0478
286	8-14	F7.4	PINDEM(1,71)	0.0000
286	15-21	F7.4	PDEATH(2,71)	0.0346

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
286	22-28	F7.4	PINDEM(2,71)	0.0000
287	1-7	F7.4	PDEATH(1,72)	0.0478
287	8-14	F7.4	PINDEM(1,72)	0.0000
287	15-21	F7.4	PDEATH(2,72)	0.0346
287	22-28	F7.4	PINDEM(2,72)	0.0000
288	1-7	F7.4	PDEATH(1,73)	0.0478
288	8-14	F7.4	PINDEM(1,73)	0.0000
288	15-21	F7.4	PDEATH(2,73)	0.0346
288	22-28	F7.4	PINDEM(2,73)	0.0000
289	1-7	F7.4	PDEATH(1,74)	0.0478
289	8-14	F7.4	PINDEM(1,74)	0.0000
289	15-21	F7.4	PDEATH(2,74)	0.0346
289	22-28	F7.4	PINDEM(2,74)	0.0000
290	1-7	F7.4	PDEATH(1,75)	0.0478
290	8-14	F7.4	PINDEM(1,75)	0.0000
290	15-21	F7.4	PDEATH(2,75)	0.0346
290	22-28	F7.4	PINDEM(2,75)	0.0000
291	1-7	F7.4	PDEATH(1,76)	0.0686
291	8-14	F7.4	PINDEM(1,76)	0.0000
291	15-21	F7.4	PDEATH(2,76)	0.0564
291	22-28	F7.4	PINDEM(2,76)	0.0000
292	1-7	F7.4	PDEATH(1,77)	0.0686
292	8-14	F7.4	PINDEM(1,77)	0.0000
292	15-21	F7.4	PDEATH(2,77)	0.0564
292	22-28	F7.4	PINDEM(2,77)	0.0000
293	1-7	F7.4	PDEATH(1,78)	0.0686
293	8-14	F7.4	PINDEM(1,78)	0.0000

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
293	15-21	F7.4	PDEATH(2,78)	0.0564
293	22-28	F7.4	PINDEM(2,78)	0.0000
294	1-7	F7.4	PDEATH(1,79)	0.0686
294	8-14	F7.4	PINDEM(1,79)	0.0000
294	15-21	F7.4	PDEATH(2,79)	0.0564
294	22-28	F7.4	PINDEM(2,79)	0.0000
295	1-7	F7.4	PDEATH(1,80)	0.0686
295	8-14	F7.4	PINDEM(1,80)	0.0000
295	15-21	F7.4	PDEATH(2,80)	0.0564
295	22-28	F7.4	PINDEM(2,80)	0.0000
296	1-7	F7.4	PDEATH(1,81)	0.1175
296	8-14	F7.4	PINDEM(1,81)	0.0000
296	15-21	F7.4	PDEATH(2,81)	0.1000
296	22-28	F7.4	PINDEM(2,81)	0.0000
297	1-7	F7.4	PDEATH(1,82)	0.1175
297	8-14	F7.4	PINDEM(1,82)	0.0000
297	15-21	F7.4	PDEATH(2,82)	0.1000
297	22-28	F7.4	PINDEM(2,82)	0.0000
298	1-7	F7.4	PDEATH(1,83)	0.1175
298	8-14	F7.4	PINDEM(1,83)	0.0000
298	15-21	F7.4	PDEATH(2,83)	0.1000
298	22-28	F7.4	PINDEM(2,83)	0.0000
299	1-7	F7.4	PDEATH(1,84)	0.1175
299	8-14	F7.4	PINDEM(1,84)	0.0000
299	15-21	F7.4	PDEATH(2,84)	0.1000
299	22-28	F7.4	PINDEM(2,84)	0.0000
300	1-7	F7.4	PDEATH(1,85)	0.1175

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
300	8-14	F7.4	PINDEM(1,85)	0.0000
300	15-21	F7.4	PDEATH(2,85)	0.1000
300	22-28	F7.4	PINDEM(2,85)	0.0000
301	1-7	F7.4	PDEATH(1,86)	0.1981
301	8-14	F7.4	PINDEM(1,86)	0.0000
301	15-21	F7.4	PDEATH(2,86)	0.1875
301	22-28	F7.4	PINDEM(2,86)	0.0000
302	1-6	F6.3	PBIRTH(15)	0.060
302	7-12	F6.3	PBIRTH(16)	0.060
302	13-18	F6.3	PBIRTH(17)	0.060
302	19-24	F6.3	PBIRTH(18)	0.060
302	25-30	F6.3	PBIRTH(19)	0.060
302	31-36	F6.3	PBIRTH(20)	0.234
302	37-42	F6.3	PBIRTH(21)	0.234
302	43-48	F6.3	PBIRTH(22)	0.234
302	49-54	F6.3	PBIRTH(23)	0.234
302	55-60	F6.3	PBIRTH(24)	0.234
303	1-6	F6.3	PBIRTH(25)	0.272
303	7-12	F6.3	PBIRTH(26)	0.272
303	13-18	F6.3	PBIRTH(27)	0.272
303	19-24	F6.3	PBIRTH(28)	0.272
303	25-30	F6.3	PBIRTH(29)	0.272
303	31-36	F6.3	PBIRTH(30)	0.252
303	37-42	F6.3	PBIRTH(31)	0.252
303	43-48	F6.3	PBIRTH(32)	0.252
303	49-54	F6.3	PBIRTH(33)	0.252
303	55-60	F6.3	PBIRTH(34)	0.252

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
304	1-6	F6.3	PBIRTH(35)	0.201
304	7-12	F6.3	PBIRTH(36)	0.201
304	13-18	F6.3	PBIRTH(37)	0.201
304	19-24	F6.3	PBIRTH(38)	0.201
304	25-30	F6.3	PBIRTH(39)	0.201
304	31-36	F6.3	PBIRTH(40)	0.110
304	37-42	F6.3	PBIRTH(41)	0.110
304	43-48	F6.3	PBIRTH(42)	0.110
304	49-54	F6.3	PBIRTH(43)	0.110
304	55-60	F6.3	PBIRTH(44)	0.110
305	1-5	F5.2	CALAGE(1)	2.60
305	5-10	F5.2	CALAGE(2)	2.35
305	11-15	F5.2	CALAGE(3)	2.10
305	16-20	F5.2	CALAGE(4)	1.80
305	21-25	F5.2	CALAGE(5)	1.55
305	26-30	F5.2	CALAGE(6)	1.25
305	31-35	F5.2	CALAGE(7)	1.05
305	36-40	F5.2	CALAGE(8)	1.00
306	1-5	F5.2	PROAGE(1)	3.35
306	6-10	F5.2	PROAGE(2)	2.35
306	11-15	F5.2	PROAGE(3)	2.20
306	16-20	F5.2	PROAGE(4)	2.05
306	21-25	F5.2	PROAGE(5)	1.95
306	26-30	F5.2	PROAGE(6)	1.85
306	31-35	F5.2	PROAGE(7)	1.80
306	36-40	F5.2	PROAGE(8)	1.70
306	41-45	F5.2	PROAGE(9)	1.60
306	46-50	F5.2	PROAGE(10)	1.55

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
307	1-5	F5.2	PROAGE(11)	1.50
307	6-10	F5.2	PROAGE(12)	1.45
307	11-15	F5.2	PROAGE(13)	1.40
307	16-20	F5.2	PROAGE(14)	1.33
307	21-25	F5.2	PROAGE(15)	1.23
307	26-30	F5.2	PROAGE(16)	1.15
307	31-35	F5.2	PROAGE(17)	1.12
307	36-40	F5.2	PROAGE(18)	1.08
307	41-45	F5.2	PROAGE(19)	1.00
308	1-6	F6.3	PMARRY	0.069
308	7-10	F4.0	AGBRME	21
308	11-14	F4.0	AGBRSD	9
308	15-20	F6.3	PINDIM	0.049
308	21-26	F6.3	PMIMIG	0.625
309	1-6	F6.3	PRIMAG(1,1)	0.000
309	7-12	F6.3	PRIMAG(1,2)	0.000
309	13-18	F6.3	PRIMAG(1,3)	0.000
309	19-24	F6.3	PRIMAG(1,4)	0.000
309	25-30	F6.3	PRIMAG(1,5)	0.000
309	31-36	F6.3	PRIMAG(1,6)	0.000
309	37-42	F6.3	PRIMAG(1,7)	0.000
309	43-48	F6.3	PRIMAG(1,8)	0.000
309	49-54	F6.3	PRIMAG(1,9)	0.000
309	55-60	F6.3	PRIMAG(1,10)	0.000
310	1-6	F6.3	PRIMAG(1,11)	0.000
310	7-12	F6.3	PRIMAG(1,12)	0.000
310	13-18	F6.3	PRIMAG(1,13)	0.000

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
313	1-6	F6.3	PRIMAG(1,41)	0.000
313	7-12	F6.3	PRIMAG(1,42)	0.000
313	13-18	F6.3	PRIMAG(1,43)	0.000
313	19-24	F6.3	PRIMAG(1,44)	0.000
313	25-30	F6.3	PRIMAG(1,45)	0.000
313	31-36	F6.3	PRIMAG(1,46)	0.000
313	37-42	F6.3	PRIMAG(1,47)	0.000
313	43-48	F6.3	PRIMAG(1,48)	0.000
313	49-54	F6.3	PRIMAG(1,49)	0.067
313	55-60	F6.3	PRIMAG(1,50)	0.000
314	1-6	F6.3	PRIMAG(1,51)	0.000
314	7-12	F6.3	PRIMAG(1,52)	0.000
314	13-18	F6.3	PRIMAG(1,53)	0.000
314	19-24	F6.3	PRIMAG(1,54)	0.000
314	25-30	F6.3	PRIMAG(1,55)	0.000
314	31-36	F6.3	PRIMAG(1,56)	0.000
314	37-42	F6.3	PRIMAG(1,57)	0.000
314	43-48	F6.3	PRIMAG(1,58)	0.000
314	49-54	F6.3	PRIMAG(1,59)	0.067
314	55-60	F6.3	PRIMAG(1,60)	0.000
315	1-6	F6.3	PRIMAG(1,61)	0.000
315	7-12	F6.3	PRIMAG(1,62)	0.000
315	13-18	F6.3	PRIMAG(1,63)	0.000
315	19-24	F6.3	PRIMAG(1,64)	0.000
315	25-30	F6.3	PRIMAG(1,65)	0.000
315	31-36	F6.3	PRIMAG(1,66)	0.000
315	37-42	F6.3	PRIMAG(1,67)	0.000

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
315	43-48	F6.3	PRIMAG(1,68)	0.000
315	49-54	F6.3	PRIMAG(1,69)	0.000
315	55-60	F6.3	PRIMAG(1,70)	0.000
316	1-6	F6.3	PRIMAG(1,71)	0.000
316	7-12	F6.3	PRIMAG(1,72)	0.000
316	13-18	F6.3	PRIMAG(1,73)	0.000
316	19-24	F6.3	PRIMAG(1,74)	0.000
316	25-30	F6.3	PRIMAG(1,75)	0.000
316	31-36	F6.3	PRIMAG(1,76)	0.000
316	37-42	F6.3	PRIMAG(1,77)	0.000
316	43-48	F6.3	PRIMAG(1,78)	0.000
316	49-54	F6.3	PRIMAG(1,79)	0.000
316	55-60	F6.3	PRIMAG(1,80)	0.000
317	1-6	F6.3	PRIMAG(1,81)	0.000
317	7-12	F6.3	PRIMAG(1,82)	0.000
317	13-18	F6.3	PRIMAG(1,83)	0.000
317	19-24	F6.3	PRIMAG(1,84)	0.000
317	25-30	F6.3	PRIMAG(1,85)	0.000
317	31-36	F6.3	PRIMAG(1,86)	0.000
318	1-6	F6.3	PRIMAG(2,1)	0.000
318	7-12	F6.3	PRIMAG(2,2)	0.000
318	13-18	F6.3	PRIMAG(2,3)	0.000
318	19-24	F6.3	PRIMAG(2,4)	0.111
318	25-30	F6.3	PRIMAG(2,5)	0.000
318	31-36	F6.3	PRIMAG(2,6)	0.111
318	37-42	F6.3	PRIMAG(2,7)	0.000
318	43-48	F6.3	PRIMAG(2,8)	0.111

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
318	49-54	F6.3	PRIMAG(2,9)	0.111
318	55-60	F6.3	PRIMAG(2,10)	0.000
319	1-6	F6.3	PRIMAG(2,11)	0.000
319	7-12	F6.3	PRIMAG(2,12)	0.000
319	13-18	F6.3	PRIMAG(2,13)	0.000
319	19-24	F6.3	PRIMAG(2,14)	0.111
319	25-30	F6.3	PRIMAG(2,15)	0.000
319	31-36	F6.3	PRIMAG(2,16)	0.000
319	37-42	F6.3	PRIMAG(2,17)	0.000
319	43-48	F6.3	PRIMAG(2,18)	0.000
319	49-54	F6.3	PRIMAG(2,19)	0.111
319	55-60	F6.3	PRIMAG(2,20)	0.000
320	1-6	F6.3	PRIMAG(2,21)	0.000
320	7-12	F6.3	PRIMAG(2,22)	0.000
320	13-18	F6.3	PRIMAG(2,23)	0.000
320	19-24	F6.3	PRIMAG(2,24)	0.000
320	25-30	F6.3	PRIMAG(2,25)	0.000
320	31-36	F6.3	PRIMAG(2,26)	0.000
320	37-42	F6.3	PRIMAG(2,27)	0.000
320	43-48	F6.3	PRIMAG(2,28)	0.111
320	49-54	F6.3	PRIMAG(2,29)	0.000
320	55-60	F6.3	PRIMAG(2,30)	0.000
321	1-6	F6.3	PRIMAG(2,31)	0.000
321	7-12	F6.3	PRIMAG(2,32)	0.000
321	13-18	F6.3	PRIMAG(2,33)	0.000
321	19-24	F6.3	PRIMAG(2,34)	0.111
321	25-30	F6.3	PRIMAG(2,35)	0.000

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
321	31-36	F6.3	PRIMAG(2,36)	0.000
321	37-42	F6.3	PRIMAG(2,37)	0.000
321	43-48	F6.3	PRIMAG(2,38)	0.000
321	49-54	F6.3	PRIMAG(2,39)	0.000
321	55-60	F6.3	PRIMAG(2,40)	0.000
322	1-6	F6.3	PRIMAG(2,41)	0.000
322	7-12	F6.3	PRIMAG(2,42)	0.000
322	13-18	F6.3	PRIMAG(2,43)	0.000
322	19-24	F6.3	PRIMAG(2,44)	0.000
322	25-30	F6.3	PRIMAG(2,45)	0.000
322	31-36	F6.3	PRIMAG(2,46)	0.000
322	37-42	F6.3	PRIMAG(2,47)	0.000
322	43-48	F6.3	PRIMAG(2,48)	0.000
322	49-54	F6.3	PRIMAG(2,49)	0.000
322	55-60	F6.3	PRIMAG(2,50)	0.000
323	1-6	F6.3	PRIMAG(2,51)	0.000
323	7-12	F6.3	PRIMAG(2,52)	0.000
323	13-18	F6.3	PRIMAG(2,53)	0.000
323	19-24	F6.3	PRIMAG(2,54)	0.000
323	25-30	F6.3	PRIMAG(2,55)	0.000
323	31-36	F6.3	PRIMAG(2,56)	0.000
323	37-42	F6.3	PRIMAG(2,57)	0.000
323	43-48	F6.3	PRIMAG(2,58)	0.000
323	49-54	F6.3	PRIMAG(2,59)	0.000
323	55-60	F6.3	PRIMAG(2,60)	0.000
324	1-6	F6.3	PRIMAG(2,61)	0.000
324	7-12	F6.3	PRIMAG(2,62)	0.000
324	13-18	F6.3	PRIMAG(2,63)	0.111

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
324	19-24	F6.3	PRIMAG(2,64)	0.000
324	25-30	F6.3	PRIMAG(2,65)	0.000
324	31-36	F6.3	PRIMAG(2,66)	0.000
324	37-42	F6.3	PRIMAG(2,67)	0.000
324	43-48	F6.3	PRIMAG(2,68)	0.000
324	49-54	F6.3	PRIMAG(2,69)	0.000
324	55-60	F6.3	PRIMAG(2,70)	0.000
325	1-6	F6.3	PRIMAG(2,71)	0.000
325	7-12	F6.3	PRIMAG(2,72)	0.000
325	13-18	F6.3	PRIMAG(2,73)	0.000
325	19-24	F6.3	PRIMAG(2,74)	0.000
325	25-30	F6.3	PRIMAG(2,75)	0.000
325	31-36	F6.3	PRIMAG(2,76)	0.000
325	37-42	F6.3	PRIMAG(2,77)	0.000
325	43-48	F6.3	PRIMAG(2,78)	0.000
325	49-54	F6.3	PRIMAG(2,79)	0.000
325	55-60	F6.3	PRIMAG(2,80)	0.000
326	1-6	F6.3	PRIMAG(2,81)	0.000
326	7-12	F6.3	PRIMAG(2,82)	0.000
326	13-18	F6.3	PRIMAG(2,83)	0.000
326	19-24	F6.3	PRIMAG(2,84)	0.000
326	25-30	F6.3	PRIMAG(2,85)	0.000
326	31-36	F6.3	PRIMAG(2,86)	0.000
327	1-5	F5.0	CALMIN	2550
327	6-10	F5.1	PROMIN	38.0
327	11-15	F5.1	ANPMIN	25.0
327	16-23	F8.2	CHPCMI	54.40

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
327	24-31	F8.2	CHPFMI	326.40
327	32-36	F5.2	CLLMAX	0.50
328	1-5	F5.0	CALREQ(1)	820
328	6-10	F5.0	CALREQ(2)	1180
328	11-15	F5.0	CALREQ(3)	1355
328	16-20	F5.0	CALREQ(4)	1540
328	21-25	F5.0	CALREQ(5)	1695
328	26-30	F5.0	CALREQ(6)	1830
328	31-35	F5.0	CALREQ(7)	1955
328	36-40	F5.0	CALREQ(8)	2075
328	41-45	F5.0	CALREQ(9)	2185
328	46-50	F5.0	CALREQ(10)	2295
328	51-55	F5.0	CALREQ(11)	2400
328	56-60	F5.0	CALREQ(12)	2475
328	61-65	F5.0	CALREQ(13)	2550
329	1-5	F5.0	CALREQ(14)	2625
329	6-10	F5.0	CALREQ(15)	2700
329	11-15	F5.0	CALREQ(16)	2750
329	16-20	F5.0	CALREQ(17)	2735
329	21-25	F5.0	CALREQ(18)	2720
329	26-30	F5.0	CALREQ(19)	2685
329	31-35	F5.0	CALREQ(20)	2610
329	36-40	F5.0	CALREQ(21)	2600
329	41-45	F5.0	CALREQ(22)	2470
329	46-50	F5.0	CALREQ(23)	2340
329	51-55	F5.0	CALREQ(24)	2080
329	56-60	F5.0	CALREQ(25)	1820

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
330	1-5	F5.1	PROREQ(1)	11.9
330	6-10	F5.1	PROREQ(2)	12.3
330	11-15	F5.1	PROREQ(3)	15.4
330	16-20	F5.1	PROREQ(4)	19.2
330	21-25	F5.1	PROREQ(5)	23.1
330	26-30	F5.1	PROREQ(6)	26.2
330	31-35	F5.1	PROREQ(7)	26.2
330	36-40	F5.1	PROREQ(8)	25.4
331	1-6	F6.1	CALOR(1)	2360.0
331	7-12	F6.3	TOTPRO(1)	0.053
331	13-18	F6.3	ANIPRO(1)	0.000
332	1-6	F6.1	CALOR(2)	0.0
332	7-12	F6.3	TOTPRO(2)	0.000
332	13-18	F6.3	ANIPRO(2)	0.000
333	1-6	F6.1	CALOR(3)	3260.0
333	7-12	F6.3	TOTPRO(3)	0.191
333	13-18	F6.3	ANIPRO(3)	0.000
334	1-6	F6.1	CALOR(4)	3360.0
334	7-12	F6.3	TOTPRO(4)	0.226
334	13-18	F6.3	ANIPRO(4)	0.000
335	1-6	F6.1	CALOR(5)	3440.0
335	7-12	F6.3	TOTPRO(5)	0.136
335	13-18	F6.3	ANIPRO(5)	0.000
336	1-6	F6.1	CALOR(6)	3440.0
336	7-12	F6.3	TOTPRO(6)	0.136
336	13-18	F6.3	ANIPRO(6)	0.000
337	1-6	F6.1	CALOR(7)	0.0

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
337	7-12	F6.3	TOTPRO(7)	0.000
337	13-18	F6.3	ANIPRO(7)	0.000
338	1-6	F6.1	CALOR(8)	0.0
338	7-12	F6.3	TOTPRO(8)	0.000
338	13-18	F6.3	ANIPRO(8)	0.000
339	1-6	F6.1	CALOR(9)	1000.0
339	7-12	F6.3	TOTPRO(9)	0.000
339	13-18	F6.3	ANIPRO(9)	0.000
340	1-6	F6.1	CALOR(10)	0.0
340	7-12	F6.3	TOTPRO(10)	1.000
340	13-18	F6.3	ANIPRO(10)	0.000
341	1-6	F6.1	CALOR(11)	0.0
341	7-12	F6.3	TOTPRO(11)	0.000
341	13-18	F6.3	ANIPRO(11)	1.000
342	1-6	F6.1	CALOR(12)	0.0
342	7-12	F6.3	TOTPRO(12)	0.000
342	13-18	F6.3	ANIPRO(12)	0.000
343	1-6	F6.1	CALOR(13)	2396.0
343	7-12	F6.3	TOTPRO(13)	0.189
343	13-18	F6.3	ANIPRO(13)	0.189
344	1-6	F6.1	CALOR(14)	1160.0
344	7-12	F6.3	TOTPRO(14)	0.210
344	13-18	F6.3	ANIPRO(14)	0.210
345	1-6	F6.1	CALOR(15)	0.0
345	7-12	F6.3	TOTPRO(15)	0.000
345	13-18	F6.3	ANIPRO(15)	0.000
346	1-6	F6.1	CALOR(16)	4220.0

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
346	7-12	F6.3	TOTPRO(16)	0.150
346	13-18	F6.3	ANIPRO(16)	0.150
347	1-6	F6.1	CALOR(17)	2500.0
347	7-12	F6.3	TOTPRO(17)	0.210
347	13-18	F6.3	ANIPRO(17)	0.210
348	1-8	F8.1	BASEPY	303.0
348	9-13	F5.2	YREFF(1)	1.00
348	14-18	F5.2	YREFF(2)	0.63
348	19-23	F5.2	YREFF(3)	0.49
348	24-28	F5.2	YREFF(4)	0.49
348	29-33	F5.2	YREFF(5)	0.49
348	34-38	F5.2	PACOEFF	4.84
348	39-43	F5.2	PACONS	8.68
348	44-49	F6.2	PACHIP	39.72
348	50-54	F5.2	WGPTDW	0.14
348	55-59	F5.2	TDNPDM	0.54
349	1-6	F6.1	ELLIM(1)	100.0
349	7-12	F6.1	ELLIM(2)	9.0
350	1-5	F5.0	DOSECA(1,1,1)	25
350	6-10	F5.0	DOSECA(1,1,2)	50
350	11-15	F5.0	DOSECA(1,1,3)	100
350	16-20	F5.0	DOSECA(1,2,1)	0
350	21-25	F5.0	DOSECA(1,2,2)	10
350	26-30	F5.0	DOSECA(1,2,3)	25
351	1-5	F5.0	DOSECA(2,1,1)	25
351	6-10	F5.0	DOSECA(2,1,2)	50
351	11-15	F5.0	DOSECA(2,1,3)	200

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
351	16-20	F5.0	DOSECA(2,2,1)	0
351	21-25	F5.0	DOSECA(2,2,2)	10
351	26-30	F5.0	DOSECA(2,2,3)	50
352	1-5	F5.0	DOSECA(3,1,1)	10
352	6-10	F5.0	DOSECA(3,1,2)	20
352	11-15	F5.0	DOSECA(3,1,3)	50
352	16-20	F5.0	DOSECA(3,2,1)	(blank)
352	21-25	F5.0	DOSECA(3,2,2)	(blank)
352	26-30	F5.0	DOSECA(3,2,3)	(blank)
353	1-5	F5.0	DOSECA(4,1,1)	0
353	6-10	F5.0	DOSECA(4,1,2)	0
353	11-15	F5.0	DOSECA(4,1,3)	0
353	16-20	F5.0	DOSECA(4,2,1)	(blank)
353	21-25	F5.0	DOSECA(4,2,2)	(blank)
353	26-30	F5.0	DOSECA(4,2,3)	(blank)
354	1-5	F5.0	DOSEPE(1,1,1)	70
354	6-10	F5.0	DOSEPE(1,1,2)	100
354	11-15	F5.0	DOSEPE(1,1,3)	150
354	16-20	F5.0	DOSEPE(1,1,4)	300
354	21-25	F5.0	DOSEPE(1,2,1)	30
354	26-30	F5.0	DOSEPE(1,2,2)	40
354	31-35	F5.0	DOSEPE(1,2,3)	50
354	36-40	F5.0	DOSEPE(1,2,4)	100
355	1-5	F5.0	DOSEPE(2,1,1)	60
355	6-10	F5.0	DOSEPE(2,1,2)	80
355	11-15	F5.0	DOSEPE(2,1,3)	100
355	16-20	F5.0	DOSEPE(2,1,4)	200

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
355	21-25	F5.0	DOSEPE(2,2,1)	0
355	26-30	F5.0	DOSEPE(2,2,2)	0
355	31-35	F5.0	DOSEPE(2,2,3)	25
355	36-40	F5.0	DOSEPE(2,2,4)	50
356	1-5	F5.0	DOSEPE(3,1,1)	40
356	6-10	F5.0	DOSEPE(3,1,2)	60
356	11-15	F5.0	DOSEPE(3,1,3)	80
356	16-20	F5.0	DOSEPE(3,1,4)	100
356	21-25	F5.0	DOSEPE(3,2,1)	(blank)
356	26-30	F5.0	DOSEPE(3,2,2)	(blank)
356	31-35	F5.0	DOSEPE(3,2,3)	(blank)
356	36-40	F5.0	DOSEPE(3,2,4)	(blank)
357	1-5	F5.0	DOSEPE(4,1,1)	2222
357	6-10	F5.0	DOSEPE(4,1,2)	2222
357	11-15	F5.0	DOSEPE(4,1,3)	2222
357	16-20	F5.0	DOSEPE(4,1,4)	2222
357	21-25	F5.0	DOSEPE(4,2,1)	(blank)
357	26-30	F5.0	DOSEPE(4,2,2)	(blank)
357	31-35	F5.0	DOSEPE(4,2,3)	(blank)
357	36-40	F5.0	DOSEPE(4,2,4)	(blank)
358	1-8	F8.3	PRICFE(1)	0.430
358	9-16	F8.3	PRICFE(2)	5.900
358	17-24	F8.3	PRICFE(3)	2.600
358	25-32	F8.3	PRICFE(4)	5.910
358	33-40	F8.3	PRICFE(5)	0.430
359	1-6	F6.3	PFERT(1)	0.250
359	7-12	F6.3	PFERT(2)	0.539

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
359	13-21	F9.6	SLOLI	0.000405
359	22-27	F6.3	CONSLI	0.009
359	28-32	F5.0	ALLIME	2000
359	33-39	F7.4	SLOPHO	0.0568
359	40-45	F6.2	CONPHO	-6.41
360	1-4	F4.0	FINLME	24
360	5-8	F4.0	FINLSD	3
360	9-13	F5.0	FICOME	1041
360	14-18	F5.0	FICOSD	148
360	19-23	F5.2	PRFINL(1)	0.11
360	24-28	F5.2	PRFINL(2)	0.00
360	29-33	F5.2	PRFINL(3)	0.00
360	34-38	F5.2	PRFINL(4)	0.00
360	39-43	F5.2	PRFINL(5)	0.11
360	44-48	F5.2	PRFINL(6)	0.08
360	49-53	F5.2	PRFINL(7)	0.08
360	54-58	F5.2	PRFINL(8)	0.29
360	59-63	F5.2	PRFINL(9)	0.11
360	64-68	F5.2	PRFINL(10)	0.11
360	69-73	F5.3	PRFINL(11)	0.11
360	74-78	F5.3	PRFINL(12)	0.00
361	1-5	F5.2	DEPREC	0.20
362	1-6	F6.3	SMTYPR	0.169
362	7-12	F6.3	VITYPR	0.221
363	1-6	F6.1	COLAB(1)	15.0
363	7-12	F6.1	COLAB(2)	15.0
363	13-18	F6.1	COLAB(3)	15.0
363	19-24	F6.1	COLAB(4)	15.0
363	25-30	F6.1	COLAB(5)	15.0
363	31-36	F6.1	COLAB(6)	20.0

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
363	37-42	F6.1	COLAB(7)	15.0
363	43-48	F6.1	COLAB(8)	20.0
363	49-54	F6.1	COLAB(9)	20.0
363	55-60	F6.1	COLAB(10)	15.0
363	61-66	F6.1	COLAB(11)	15.0
363	67-72	F6.1	COLAB(12)	15.0
364	1-6	F6.2	BUYME(1)	2.44
364	7-12	F6.2	BUYSD(1)	0.84
364	13-18	F6.2	SELLME(1)	1.25
364	19-24	F6.2	SELLSD(1)	0.24
365	1-6	F6.2	BUYME(2)	0.85
365	7-12	F6.2	BUYSD(2)	0.13
365	13-18	F6.2	SELLME(2)	0.74
365	19-24	F6.2	SELLSD(2)	0.24
366	1-6	F6.2	BUYME(3)	10.62
366	7-12	F6.2	BUYSD(3)	4.15
366	13-18	F6.2	SELLME(3)	3.64
366	19-24	F6.2	SELLSD(3)	1.17
367	1-6	F6.2	BUYME(4)	8.85
367	7-12	F6.2	BUYSD(4)	3.46
367	13-18	F6.2	SELLME(4)	3.02
367	19-24	F6.2	SELLSD(4)	0.98
368	1-6	F6.2	BUYME(5)	2.90
368	7-12	F6.2	BUYSD(5)	0.60
368	13-18	F6.2	SELLME(5)	1.31
368	19-24	F6.2	SELLSD(5)	0.00
369	1-6	F6.2	BUYME(6)	2.90
369	7-12	F6.2	BUYSD(6)	0.60
369	13-18	F6.2	SELLME(6)	1.31
369	19-24	F6.2	SELLSD(6)	0.00

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
370	1-6	F6.2	BUYME(7)	0.00
370	7-12	F6.2	BUYSD(7)	0.00
370	13-18	F6.2	SELLME(7)	6.00
370	19-24	F6.2	SELLSD(7)	0.00
371	1-6	F6.2	BUYME(8)	0.00
371	7-12	F6.2	BUYSD(8)	0.00
371	13-18	F6.2	SELLME(8)	7.52
371	19-24	F6.2	SELLSD(8)	0.00
372	1-6	F6.2	BUYME(9)	0.84
372	7-12	F6.2	BUYSD(9)	0.00
372	13-18	F6.2	SELLME(9)	0.00
372	19-24	F6.2	SELLSD(9)	0.00
373	1-6	F6.2	BUYME(10)	248.64
373	7-12	F6.2	BUYSD(10)	0.00
373	13-18	F6.2	SELLME(10)	0.00
373	19-24	F6.2	SELLSD(10)	0.00
374	1-6	F6.2	BUYME(11)	248.64
374	7-12	F6.2	BUYSD(11)	0.00
374	13-18	F6.2	SELLME(11)	0.00
374	19-24	F6.2	SELLSD(11)	0.00
375	1-6	F6.2	BUYME(12)	10.00
375	7-12	F6.2	BUYSD(12)	0.00
375	13-18	F6.2	SELLME(12)	5.34
375	19-24	F6.2	SELLSD(12)	0.00
376	1-6	F6.2	BUYME(13)	33.32
376	7-12	F6.2	BUYSD(13)	4.44
376	13-18	F6.2	SELLME(13)	25.32
376	19-24	F6.2	SELLSD(13)	0.00
377	1-6	F6.2	BUYME(14)	9.23
377	7-12	F6.2	BUYSD(14)	2.18
377	13-18	F6.2	SELLME(14)	9.23

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
377	19-24	F6.2	SELLSD(14)	2.18
378	1-6	F6.2	BUYME(15)	0.00
378	7-12	F6.2	BUYSD(15)	0.00
378	13-18	F6.2	SELLME(15)	0.00
378	19-24	F6.2	SELLSD(15)	0.00
379	1-6	F6.2	BUYME(16)	0.00
379	7-12	F6.2	BUYSD(16)	0.00
379	13-18	F6.2	SELLME(16)	0.00
379	19-24	F6.2	SELLSD(16)	0.00
380	1-6	F6.2	BUYME(17)	14.93
380	7-12	F6.2	BUYSD(17)	4.53
380	13-18	F6.2	SELLME(17)	0.00
380	19-24	F6.2	SELLSD(17)	0.00
381	1-5	F5.1	CONMAX	2.0
382	1-6	F6.3	PCRECD	0.053
382	7-12	F6.0	CRECME	17788
382	13-18	F6.0	CRECSD	20344
382	19-24	F6.3	PCSENT	0.011
382	25-30	F6.0	CSENME	492
382	31-36	F6.0	CSENSD	121
383	1-5	F5.2	PSELLB(1)	0.43
383	6-10	F5.2	PSELLB(2)	0.00
383	11-15	F5.2	PSELLB(3)	0.00
383	16-20	F5.2	PSELLB(4)	0.00
383	21-25	F5.2	PSELLB(5)	0.00
383	26-30	F5.2	PSELLB(6)	0.00
383	31-35	F5.2	PSELLB(7)	0.00
383	36-40	F5.2	PSELLB(8)	0.00
383	41-45	F5.2	PSELLB(9)	0.00
383	46-50	F5.2	PSELLB(10)	0.00
384	1-5	F5.2	PRVOLP	0.25

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
384	6-10	F5.2	PPLPAY	0.10
385	1-5	F5.1	SEED(1)	29.6
385	6-10	F5.1	SEED(2)	12.6
385	11-15	F5.1	SEED(3)	29.2
385	16-20	F5.1	SEED(4)	8.1
386	1-5	F5.2	TRANME	0.12
386	6-10	F5.2	TRANSD	0.08
386	11-15	F5.2	BTRCME	75.1
386	16-20	F5.2	BTRCSD	33.3
387	1-7	F7.4	CHICMZ	0.0744
387	8-13	F6.3	CWASTE	0.581
388	1-8	F8.2	TUBCAL	176.01
388	9-16	F8.2	TUBTP	1760.51
389	1-6	F6.3	BURNPR(1)	1.000
389	7-12	F6.3	BURNPR(2)	1.000
389	13-15	F6.3	BURNPR(3)	0.271
390	1-5	F5.0	START(1)	1636
390	6-9	I4	IMPEND(1)	0
390	10-16	F7.2	YRLYIM(1)	36.00
391	1-5	F5.0	START(2)	1418
391	6-9	I4	IMPEND(2)	0
391	10-16	F7.2	YRLYIM(2)	18.00
392	1-5	F5.0	START(3)	647
392	6-9	I4	IMPEND(3)	0
392	10-16	F7.2	YRLYIM(3)	1.00
393	1-5	F5.0	START(4)	647
393	6-9	I4	IMPEND(4)	0
393	10-16	F7.2	YRLYIM(4)	1.00
394	1-5	F5.0	START(5)	3477
394	6-9	I4	IMPEND(5)	0
394	10-16	F7.2	YRLYIM(5)	32.89

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
395	1-5	F5.0	START(6)	3477
395	6-9	I4	IMPEND(6)	0
395	10-16	F7.2	YRLYIM(6)	32.89
396	1-5	F5.0	START(7)	1600
396	6-9	I4	IMPEND(7)	0
396	10-16	F7.2	YRLYIM(7)	24.00
397	1-5	F5.0	START(8)	5500
397	6-9	I4	IMPEND(8)	0
397	10-16	F7.2	YRLYIM(8)	0.00
398	1-5	F5.0	START(9)	11
398	6-9	I4	IMPEND(9)	0
398	10-16	F7.2	YRLYIM(9)	1.74
399	1-7	F7.2	PROPTY(1,1)	0.02
399	8-14	F7.0	CAPME(1,1)	0
399	15-21	F7.0	CAPSD(1,1)	0
399	22-28	F7.0	CGLME(1,1)	0
399	29-35	F7.0	CGLSD(1,1)	0
399	36-42	F7.0	CGEME(1,1)	0
399	43-49	F7.0	CGESD(1,1)	0
399	50-56	F7.0	CGCME(1,1)	0
399	57-63	F7.0	CGCSD(1,1)	0
400	1-7	F7.2	PROPTY(2,1)	0.17
400	8-14	F7.0	CAPME(2,1)	5265
400	15-21	F7.0	CAPSD(2,1)	11431
400	22-28	F7.0	CGLME(2,1)	460
400	29-35	F7.0	CGLSD(2,1)	4210
400	36-42	F7.0	CGEME(2,1)	285
400	43-49	F7.0	CGESD(2,1)	4210
400	50-56	F7.0	CGCME(2,1)	285
400	57-63	F7.0	CGCSD(2,1)	1067
401	1-7	F7.2	PROPTY(3,1)	0.22

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
401	8-14	F7.0	CAPME(3,1)	1768
401	15-21	F7.0	CAPSD(3,1)	3186
401	22-28	F7.0	CGLME(3,1)	0
401	29-35	F7.0	CGLSD(3,1)	0
401	36-42	F7.0	CGEME(3,1)	0
401	43-49	F7.0	CGESD(3,1)	0
401	50-56	F7.0	CGCME(3,1)	97
401	57-63	F7.0	CGCSD(3,1)	456
402	1-7	F7.2	PROPTY(4,1)	0.59
402	8-14	F7.0	CAPME(4,1)	2360
402	15-21	F7.0	CAPSD(4,1)	6958
402	22-28	F7.0	CGLME(4,1)	0
402	29-35	F7.0	CGLSD(4,1)	0
402	36-42	F7.0	CGEME(4,1)	0
402	43-49	F7.0	CGESD(4,1)	0
402	50-56	F7.0	CGCME(4,1)	0
402	57-63	F7.0	CGCSD(4,1)	0
403	1-7	F7.2	PROPTY(1,2)	0.11
403	8-14	F7.0	CAPME(1,2)	7849
403	15-21	F7.0	CAPSD(1,2)	11099
403	22-28	F7.0	CGLME(1,2)	0
403	29-35	F7.0	CGLSD(1,2)	0
403	36-42	F7.0	CGEME(1,2)	0
403	43-49	F7.0	CGESD(1,2)	0
403	50-56	F7.0	CGCME(1,2)	0
403	57-63	F7.0	CGESD(1,2)	0
404	1-7	F7.2	PROPTY(2,2)	0.53
404	8-14	F7.0	CAPME(2,2)	26292
404	15-21	F7.0	CAPSD(2,2)	30257
404	22-28	F7.0	CGLME(2,2)	1174

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
404	29-35	F7.0	CGLSD(2,2)	3523
404	36-42	F7.0	CGEME(2,2)	2979
404	43-49	F7.0	CGESD(2,2)	6533
404	50-56	F7.0	CGCME(2,2)	587
404	57-63	F7.0	CGCSD(2,2)	1762
405	1-7	F7.2	PROPTY(3,2)	0.05
405	8-14	F7.0	CAPME(3,2)	0
405	15-21	F7.0	CAPSD(3,2)	0
405	22-28	F7.0	CGLME(3,2)	0
405	29-35	F7.0	CGLSD(3,2)	0
405	36-42	F7.0	CGEME(3,2)	0
405	43-49	F7.0	CGESD(3,2)	0
405	50-56	F7.0	CGCME(3,2)	0
405	57-63	F7.0	CGCSD(3,2)	0
406	1-7	F7.2	PROPTY(4,2)	0.31
406	8-14	F7.0	CAPME(4,2)	1383
406	15-21	F7.0	CAPSD(4,2)	2461
406	22-28	F7.0	CGLME(4,2)	0
406	29-35	F7.0	CGLSD(4,2)	0
406	36-42	F7.0	CGEME(4,2)	0
406	43-49	F7.0	CGESD(4,2)	0
406	50-56	F7.0	CGCME(4,2)	0
406	57-63	F7.0	CGCSD(4,2)	0
407	1-5	F5.2	UNMODP(1,1)	0.50
407	6-10	F5.2	UNMODP(2,1)	0.00
407	11-15	F5.2	UNMODP(3,1)	0.50
407	16-20	F5.2	UNMODP(4,1)	0.00
408	1-5	F5.2	UNMODP(1,2)	0.55
408	6-10	F5.2	UNMODP(2,2)	0.30
408	11-15	F5.2	UNMODP(3,2)	0.15
408	16-20	F5.2	UNMODP(4,2)	0.00

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
409	1-5	F5.2	UNMODP(1,3)	0.79
409	6-10	F5.2	UNMODP(2,3)	0.17
409	11-15	F5.2	UNMODP(3,3)	0.00
409	16-20	F5.2	UNMODP(4,3)	0.04
410	1-5	F5.2	UNMODP(1,4)	0.85
410	6-10	F5.2	UNMODP(2,4)	0.07
410	11-15	F5.2	UNMODP(3,4)	0.03
410	16-20	F5.2	UNMODP(4,4)	0.05
411	1-5	F5.2	PRINME(1)	0.36
411	6-10	F5.2	PRINSD(1)	0.17
411	11-15	F5.2	PRINME(2)	0.46
411	16-20	F5.2	PRINSD(2)	0.40
411	21-25	F5.2	PRINME(3)	0.22
411	26-30	F5.2	PRINSD(3)	0.25
411	31-35	F5.2	PRINME(4)	0.12
411	36-40	F5.2	PRINSD(4)	0.13
412	1-5	F5.2	PTYLAB(1,1)	0.33
412	6-10	F5.2	PTYLAB(1,2)	0.11
412	11-15	F5.2	PTYLAB(1,3)	0.38
412	16-20	F5.2	PTYLAB(1,4)	0.39
412	21-25	F5.2	PTYLAB(2,1)	0.33
412	26-30	F5.2	PTYLAB(2,2)	0.29
412	31-35	F5.2	PTYLAB(2,3)	0.04
412	36-40	F5.2	PTYLAB(2,4)	0.09
412	41-45	F5.2	PTYLAB(3,1)	0.17
412	46-50	F5.2	PTYLAB(3,2)	0.00
412	51-55	F5.2	PTYLAB(3,3)	0.17
412	56-60	F5.2	PTYLAB(3,4)	0.06
412	61-65	F5.2	PTYLAB(4,1)	0.17
412	66-70	F5.2	PTYLAB(4,2)	0.11
412	71-75	F5.2	PTYLAB(4,3)	0.04
412	76-80	F5.2	PTYLAB(4,4)	0.09

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
413	1-4	F4.0	TOLAME(1)	31
413	5-8	F4.0	TOLASD(1)	42
413	9-12	F4.0	RMLAME(1)	31
413	13-16	F4.0	RMLASD(1)	42
413	17-28	F12.4	EARNME(1)	16.2500
413	29-40	F12.4	EARNSD(1)	0.0000
414	1-4	F4.0	TOLAME(2)	18
414	5-8	F4.0	TOLASD(2)	12
414	9-12	F4.0	RMLAME(2)	18
414	13-16	F4.0	RMLASD(2)	12
414	17-28	F12.4	EARNME(2)	0.0920
414	29-40	F12.4	EARNSD(2)	0.7754
415	1-4	F4.0	TOLAME(3)	34
415	5-8	F4.0	TOLASD(3)	23
415	9-12	F4.0	RMLAME(3)	34
415	13-16	F4.0	RMLASD(3)	23
415	17-28	F12.4	EARNME(3)	8420.5000
415	29-40	F12.4	EARNSD(3)	1142.0000
416	1-4	F4.0	TOLAME(4)	217
416	5-8	F4.0	TOLASD(4)	205
416	9-12	F4.0	RMLAME(4)	109
416	13-16	F4.0	RMLASD(4)	229
416	17-28	F12.4	EARNME(4)	6346.2000
416	29-40	F12.4	EARNSD(4)	6929.8000
417	1-6	F6.3	PLEAVE(1,1)	0.143
417	7-12	F6.3	PLEAVE(2,1)	0.063
417	13-18	F6.3	PLEAVE(1,2)	0.200

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
417	19-24	F6.3	PLEAVE(2,2)	0.012
417	25-30	F6.3	PLEAVE(1,3)	0.143
417	31-36	F6.3	PLEAVE(2,3)	0.057
417	37-42	F6.3	PLEAVE(1,4)	0.105
417	43-48	F6.3	PLEAVE(2,4)	0.022
418	1-5	F5.2	PILOME	0.74
418	6-10	F5.2	PILOSD	0.38
418	11-15	F5.2	PRCG(1,1)	0.33
418	16-20	F5.2	PRCG(1,2)	0.05
418	21-25	F5.2	PRCG(1,3)	0.07
418	26-30	F5.2	PRCG(1,4)	0.00
418	31-35	F5.2	PRCG(2,1)	0.22
418	36-40	F5.2	PRCG(2,2)	0.04
418	41-45	F5.2	PRCG(2,3)	0.00
418	46-50	F5.2	PRCG(2,4)	0.00
418	51-55	F5.2	PRCG(3,1)	0.03
418	56-60	F5.2	PRCG(3,2)	0.05
418	61-65	F5.2	PRCG(3,3)	0.00
418	66-70	F5.2	PRCG(3,4)	0.00
419	1-2	I2	LEARNS	1
419	3-7	F5.2	ZCRISK	1.13
419	8-12	F5.0	EYME(1)	1500
419	13-17	F5.0	EYSD(1)	0
419	18-22	F5.0	EYME(2)	1500
419	23-27	F5.0	EYSD(2)	0
419	28-32	F5.0	EYME(3)	800
419	33-37	F5.0	EYSD(3)	0
419	38-42	F5.0	EYME(4)	800

RECORD	COLUMNS	FORMAT	VARIABLE	VALUE USED
419	43-47	F5.0	EYSD(4)	0
419	48-52	F5.0	EYME(5)	6667
419	53-57	F5.0	EYSD(5)	0
419	58-62	F5.0	EYME(6)	6667
419	63-67	F5.0	EYSD(6)	0
420	1-6	F6.1	SUKGRI	140.6
420	7-12	F6.1	SUKGMZ	195.5
420	13-18	F6.1	SUKGBE	39.3
420	19-24	F6.1	SUKGMN	61.7
420	25-30	F6.1	SUKGMT	61.7
420	31-36	F6.1	SUCASH	1615.3
421	1-5	F5.2	CLPROB(1)	0.80
421	6-10	F5.2	CLPROB(2)	0.75
421	11-15	F5.2	CLPROB(3)	0.39
421	16-20	F5.2	CLPROB(4)	0.39
421	21-25	F5.2	CLPROB(5)	0.39
421	26-30	F5.2	CLPROB(6)	0.39
421	31-35	F5.2	CLPROB(7)	0.39
421	36-40	F5.2	CLPROB(8)	1.00
421	41-45	F5.2	CLPROB(9)	1.00

DATA DECLARED OR ASSIGNED IN THE PROGRAM:

VARIABLE	ROUTINE	VALUE USED
cacao life expectancy	CAYLD	32873
CACRPH	CAYLD	7.5
CAYREF	CAYLD	
(0-2 years)		0.000
(2-3 years)		0.125
(3-4 years)		0.375
(4-5 years)		0.750
(5 or more years)		1.000
PECRC	PEYLD	2.0
PECRP	PEYLD	10.
PECRPH	PEYLD	5.5
pepper life expectancy	PEYLD	4566
PEYREF	PEYLD	
(0-2 years)		0.00
(2-3 years)		0.40
(3-4 years)		0.80
(4 or more years)		1.00
SDEVAP(1)	BLOCK DATA	0.0219
SDEVAP(2)	BLOCK DATA	0.0178
SDEVAP(3)	BLOCK DATA	0.0123
SDEVAP(4)	BLOCK DATA	0.0270
SDEVAP(5)	BLOCK DATA	0.0258
SDEVAP(6)	BLOCK DATA	0.0302
SDEVAP(7)	BLOCK DATA	0.0342

VARIABLE	ROUTINE	VALUE USED
SDEVAP(8)	BLOCK DATA	0.0267
SDEVAP(9)	BLOCK DATA	0.0289
SDEVAP(10)	BLOCK DATA	0.0250
SDEVAP(11)	BLOCK DATA	0.0150
SDEVAP(12)	BLOCK DATA	0.0302
SDINSO(1)	BLOCK DATA	0.0243
SDINSO(2)	BLOCK DATA	0.0307
SDINSO(3)	BLOCK DATA	0.0261
SDINSO(4)	BLOCK DATA	0.0289
SDINSO(5)	BLOCK DATA	0.0667
SDINSO(6)	BLOCK DATA	0.0313
SDINSO(7)	BLOCK DATA	0.0162
SDINSO(8)	BLOCK DATA	0.0108
SDINSO(9)	BLOCK DATA	0.0136
SDINSO(10)	BLOCK DATA	0.0231
SDINSO(11)	BLOCK DATA	0.0263
SDINSO(12)	BLOCK DATA	0.0336
SDRAIN(1)	BLOCK DATA	0.0485
SDRAIN(2)	BLOCK DATA	0.0490
SDRAIN(3)	BLOCK DATA	0.0412
SDRAIN(4)	BLOCK DATA	0.0478
SDRAIN(5)	BLOCK DATA	0.0696
SDRAIN(6)	BLOCK DATA	0.0648
SDRAIN(7)	BLOCK DATA	0.0843
SDRAIN(8)	BLOCK DATA	0.1096
SDRAIN(9)	BLOCK DATA	0.0969
SDRAIN(10)	BLOCK DATA	0.1013
SDRAIN(11)	BLOCK DATA	0.1346
SDRAIN(12)	BLOCK DATA	0.0677

INPUT DATA EXAMPLE

Data in data file (logical input/output unit 14 = BANKDATA)

```
 1      0.00  0.33  0.00  0.33  0.33  0.00  0.00
 2      0.09  0.73  0.09  0.00  0.00  0.00  0.09
 3      0.00  0.17  0.33  0.00  0.50  0.00  0.00
 4      0.09  0.00  0.00  0.36  0.36  0.18  0.00
 5      0.11  0.00  0.33  0.44  0.00  0.11  0.00
 6      0.00  0.00  0.00  0.40  0.20  0.40  0.00
 7      0.00  1.00  0.00  0.00  0.00  0.00  0.00
 8      0.40  0.43  0.09  0.06  0.00  0.00  0.03
 9      0.25  0.43  0.15  0.08  0.08  0.02  0.00
10      0.12  0.36  0.24  0.08  0.12  0.08  0.00
11      0.12  0.29  0.12  0.24  0.24  0.00  0.00
12      0.00  0.25  0.15  0.20  0.30  0.10  0.00
13      0.00  0.20  0.40  0.00  0.40  0.00  0.00
14      1.00  0.00  0.00  0.00  0.00  0.00  0.00
15     0.43 0.41 0.07 0.01 0.01 0.03 0.04 PRI PRIMZ PRIBM PRISM PRIMZS PRIPA PRIMZB
16     0.90 (0.10) PRIS (PRSMZPS)
17     0.32 (0.69) PRVI (PRMZVI)
18     0.62 0.00 0.08 (0.30) PRBM PRBMPI PRBMEZ (PRBMRIMZ)
19     0.91 0.04 0.00 (0.09) PRSM PRSMPI PRSMEZ (PRRIMZSM)
20     0.66 0.09 0.07 0.00 0.07 0.01 0.00 0.00 0.10 0.00        ANNUAL CROP STRATEGY
21     0.54 0.16 0.02 0.00 0.06 0.00 0.07 0.03 0.12 0.00      TREE CROPS STRATEGY
22     0.35 0.03 0.05 0.00 0.05 0.00 0.00 0.00 0.40 0.12    RANCHING STRATEGY
23     0.83 0.00 0.17 0.00 0.00 0.00 0.00 0.00 0.00 0.00      OUTSIDE LABOR STRATEGY
24     0.03 0.00    PCAGFF  PPEGCA
25       0.0   0.0   0.0   0.0   0.0   0.0   6.9   6.9   6.9   8.0   0.0   0.0 VIRGIN
26       0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0  10.0  10.0   4.8   0.0 SEC.GTH
27       0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   7.0   1.7   0.0 WEEDS
28       6.3   3.7   3.7   0.0   0.0  14.1   4.1   0.0   0.0   0.0   0.0   0.0  RICE
29       0.0   4.7   4.7   0.0   0.0   0.0   0.0   5.0   5.0   0.0   0.0   2.0  MAIZE
30       0.0   0.0   0.0  13.4   0.0   6.2  11.2   0.0   0.0   0.0   0.0   0.0  BEANS
31       0.0  20.3  20.3  20.3  20.3   0.0   0.0   0.0   0.0   0.0  20.3  20.3 MANIOC
32      20.0   0.0   0.0   0.0   0.0   0.0   0.0  15.0   6.0   0.0  22.0  22.0  CACAO
33      27.0  13.5   1.5   4.5  12.0   0.0  46.3  46.3  10.0  30.0  24.0   0.0 PEPPER
34       2.3   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   3.0   0.0   0.0 PA W/A
35       0.0   0.0   0.0   0.0   0.0   0.0   4.7   4.7   0.0   0.0   0.0   0.0 PA WC A
36       9.0   9.0   9.0   9.0   9.0   9.0   9.0   9.0   9.0   9.0   9.0   9.0 CA MT
37       1.5   9.0   2.5   1.5   0.0  11.5   1.5   9.0   2.5   0.0   9.0   2.5 PE MT
38       0.0   0.0   0.0   0.0   0.0   0.0   1.0   1.0   0.0   0.0   0.0   0.0 PAWOA M
39       0.6   0.6   0.6   0.6   0.6   0.6   4.1   4.1   0.6   0.6   0.6   0.6 PAWA MT
40       0.0   0.0   0.0   0.0   0.0   0.0   6.9   6.9   6.9   8.0   0.0   0.0 VIRGIN
41       0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0  10.0  10.0   4.8   0.0 SEC GTH
42       0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   7.0   1.7   0.0 WEEDS
43       2.5   0.0   0.0   0.0   0.0  14.1   4.1   0.0   0.0   0.0   0.0   0.0 RICE
44       0.0   0.0   0.0   0.0   0.0   0.0   0.0   2.5   2.5   0.0   2.0   0.0 MAIZE
45       0.0   0.0   0.0  13.4   0.0   0.0   5.0   0.0   0.0   0.0   0.0   0.0 BEANS
46       0.0  10.8  10.8  10.8  10.8   0.0   0.0   0.0   0.0   0.0  10.8  10.8 MANICC
47      20.0   0.0   0.0   0.0   0.0   0.0   0.0   9.0   6.0   0.0  22.0  22.0 CACAO
48      27.0   0.0   1.5   0.0   0.0   0.0  46.3  46.3  10.0  30.0  24.0   0.0 PEPPER
49       2.3   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0 PA WC A
50       0.0   0.0   0.0   0.0   0.0   0.0   4.7   4.7   0.0   0.0   0.0   0.0 PA W/AN
51       5.5   5.5   5.5   5.5   5.5   5.5   5.5   5.5   5.5   5.5   5.5   5.5 CAC MT
52       1.5   0.0   0.0   1.5   0.0  10.0   1.5   0.0   0.0   0.0   0.0   0.0 PEP MT
53       0.0   0.0   0.0   0.0   0.0   0.0   1.0   1.0   0.0   0.0   0.0   0.0 PAWOA M
54       0.6   0.6   0.6   0.6   0.6   0.6   0.6   0.6   0.6   0.6   0.6   0.6 PAWA MT
55         0     0     0     0     0     0     0     0     0     0     0     0 VIRGIN
56         0     0     0     0     0     0     0     0     0     0     0     0 SEC GTH
57         0     0     0     0     0     0     0     0     0     0     0     0 WEEDS
58         0     0     0     0     0    18     0     0     0     0     0     0 RICE
59         0     0     0     0     0     0     0     0     0     0     0    10 MAIZE
60         0     0     0     0     0     0     0     0     0     0     0     0 BEANS
```

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 61        30    30    30    30    30    30    30    30    30    30    30    30 MANIOC
 62       726     0     0     0     0     0     0     0     0     0     0     0 CACAC
 63      1638     0     0     0     0     0     0     0     0     0     0     0  PEPPER
 64         0     0     0     0     0     0     0     0     0     0     0     0 PAWO AN
 65       688     0     0     0     0     0     0     0     0     0     0     0 PAW/AN
 66        62     0     0     0     0     0     0     0     0     0     0     0 CAC MT
 67       620     0     0     0     0     0     0     0     0     0     0     0 PEP MT
 68       935     0     0     0     0     0     0     0     0     0     0     0 PAWOA MT
 69         0     0     0     0     0     0     0   200   100     0     0     0 PAWA MT
 70     6.0 6.0 1 20  346273   1  C  1999  LAND AND HOUSE
 71     7.012.0 1  8  3 1037   6  C  1  3  VIRGIN FELLING W/ 8 YR PERIOD
 72    10.013.0 1  1  0  450   6  C  4999  VIRGIN FELLING WITH 1 YR PERIOD
 73     6.0 6.0 1  4  1 7744   1  C  1999  INCRA DEBT FOR NONDURABLES
 74     7.0 2.0 1  8  3 7588   1  C  1999  OTHER DEBT FOR DURABLES
 75     6.0 6.0 1  1  C  202   3  C  1  4  INCRA SEEDS
 76    10.013.0 1  1  0  430   3  C  1999  RICE COSTEIO
 77    10.013.0 1  1  0  190   3  C  1  3  MAIZE COSTEIO
 78    10.013.0 1  1  C  340   2  C  1  3  PHASEOLUS COSTEIO
 79    10.013.0 1  8  3 6748   2  C  1999  PEPPER OR CACAO
 80    10.013.0 1  8  3 1156   5  C  1999  PASTURE WITH ANIMALS
 81     0.0 0.0 1  1  C 1000   1  O  1999  PRIVATE
 82    0.350 20    RAINFL  MAXNLC
 83     1.00 0.79 0.74 1.00 0.12 1.00 0.73 0.67 0.57 0.50 0.05 0.10  PRFIN
 84     0.18 0.18 0.25 0.10 0.17   RICE
 85     0.28 0.28 0.29 0.00 0.00     MAIZE
 86     0.06 0.05 0.09 0.00 0.00   PHASEOLUS
 87     0.00 0.00 0.00 0.00 0.00   VIGNA
 88     0.00 0.00 0.00 0.00 0.00   BITTER MANIOC
 89     0.00 0.00 0.00 0.00 0.00  SWEET MANICC
 90     0.00 0.00 0.00 0.00 0.00  CACAC
 91     0.00 0.00 0.00 0.00 0.00  PEPPER
 92     0.00 0.00 0.00 0.00 0.00     PASTURE WITHOUT ANIMALS
 93     0.00 0.00 0.00 0.00 0.00     PASTURE WITH ANIMALS
 94     0.07    15 -0.68 14.13 -2.00 84.00  PHUNT IENDHU YLDSLO YLDINT EFFSLO EFFINT
 95     0.026 0.082 0.084 0.148 0.104 0.108 0.124 0.136 0.016 0.014 0.072 0.086 EFFORT
 96     0.40    GRASTE
 97     0.00 0.00 0.16 0.00 1.00 0.23  4 0.26 0.40 0.34
 98     0.21 0.29 0.03 0.13 0.11 0.29 999 999 999 0.21 0.29 0.00 0.45 0.50 0.50
 99      37.03  37.03  OWNER AGE MEAN
100      10.78  10.78  OWNER AGE SD
101     0.9120 0.9470  PROB OTHER DEPENDENTS IF MARRIED
102     0.1820 0.0000  PROB OTHER DEPENDENTS IF SINGLE
103     0.8980 0.9500  PROB WIFE
104      31.87  31.87  WIFE AGE MEAN
105      10.67  10.67  WIFE AGE STANDARD DEVIATION
106       0.53   0.53  PROB OTHER DEPENDENT IS MALE
107       4.14   4.14  NO OTHER DEPENDENTS MEAN
108       2.27   2.27  NO OTHER DEPENDENTS SD
109       33.3  23.1  86.7  79.0  45.0  30.0                COLONIST DISEASES
110     0.0227 0.0185 0.0103 0.0214 0.0198 0.0138 0.0175  MALES MALARIA
111     0.0130 0.0144 0.0072 0.0248 0.0165             MALES MALARIA
112     0.0140 0.0098 0.0038 0.0090 0.0116 0.0191 0.0176  FEMALES MALARIA
113     0.0196 0.0025 0.0165 0.0248 0.0062 0.0248          FEMALES MALARIA
114     0.0027 0.0021 0.0033 0.0062 0.0084 0.0053 0.0095    MALES TRAUMA
115     0.0065 0.0058 0.0046 0.0038 0.0248 0.0414           MALES TRAUMA
116     0.0016 0.0009 0.0005 0.0011 0.0011 0.0006 0.0021     FEMALES TRAUMA
117     0.0039 0.0012 0.0033 0.0000 0.0062 0.0000              FEMALES TRAUMA
118     0.0405 0.0056 0.0018 0.0021 0.0038 0.0024 0.0009  MALES OTHER DISEASE
119     0.0059 0.0023 0.0033 0.0019 0.0331 0.0083   MALES OTHER DISEASE
120     0.0260 0.0021 0.0016 0.0005 0.0011 0.0032 0.0021  FEMALES OTHER DISEASE
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121     0.0065 0.0037 0.0033 0.0000 0.0062 0.0124   FEMALES OTHER DISEASE
122     0.061 0.083 0.126 0.067 0.056 0.051   MALARIA PDISMO
123     0.067 0.104 0.155 0.092 0.081 0.057   MALARIA PDISMO
124     0.051 0.080 0.048 0.070 0.090 0.049  TRAUMA PDISMO
125     0.079 0.103 0.081 0.103 0.141 0.105  TRAUMA PDISMO
126     0.083 0.084 0.083 0.083 0.084 0.083  OTHER DISEASE PDISMO
127     0.084 0.083 0.083 0.084 0.083 0.083  OTHER DISEASE PDISMO
128     0.077 0.077     PDEP (AGE = 1)
129     0.074 0.074     PDEP (AGE = 2)
130     0.064 0.064     PDEP (AGE = 3)
131     0.065 0.065     PDEP (AGE = 4)
132     0.052 0.052     PDEP (AGE = 5)
133     0.052 0.052     PDEP (AGE = 6)
134     0.055 0.055     PDEP (AGE = 7)
135     0.036 0.036     PDEP (AGE = 8)
136     0.039 0.039     PDEP (AGE = 9)
137     0.052 0.052     PDEP (AGE = 10)
138     0.061 0.061     PDEP (AGE = 11)
139     0.055 0.055     PDEP (AGE = 12)
140     0.039 0.039     PDEP (AGE = 13)
141     0.047 0.047     PDEP (AGE = 14)
142     0.017 0.017     PDEP (AGE = 15)
143     0.025 0.025     PDEP (AGE = 16)
144     0.036 0.036     PDEP (AGE = 17)
145     0.028 0.028     PDEP (AGE = 18)
146     0.011 0.011     PDEP (AGE = 19)
147     0.022 0.022     PDEP (AGE = 20)
148     0.017 0.017     PDEP (AGE = 21)
149     0.014 0.014     PDEP (AGE = 22)
150     0.008 0.008     PDEP (AGE = 23)
151     0.014 0.014     PDEP (AGE = 24)
152     0.003 0.003     PDEP (AGE = 25)
153     0.008 0.008     PDEP (AGE = 26)
154     0.000 0.000     PDEP (AGE = 27)
155     0.000 0.000     PDEP (AGE = 28)
156     0.006 0.006     PDEP (AGE = 29)
157     0.003 0.003     PDEP (AGE = 30)
158     0.000 0.000     PDEP (AGE = 31)
159     0.000 0.000     PDEP (AGE = 32)
160     0.003 0.003     PDEP (AGE = 33)
161     0.000 0.000     PDEP (AGE = 34)
162     0.000 0.000     PDEP (AGE = 35)
163     0.000 0.000     PDEP (AGE = 36)
164     0.000 0.000     PDEP (AGE = 37)
165     0.000 0.000     PDEP (AGE = 38)
166     0.000 0.000     PDEP (AGE = 39)
167     0.000 0.000     PDEP (AGE = 40)
168     0.000 0.000     PDEP (AGE = 41)
169     0.000 0.000     PDEP AGE = 42)
170     0.000 0.000     PDEP (AGE = 43)
171     0.000 0.000     PDEP (AGE = 44)
172     0.000 0.000     PDEP (AGE = 45)
173     0.000 0.000     PDEP (AGE = 46)
174     0.000 0.000     PDEP (AGE = 47)
175     0.000 0.000     PDEP (AGE = 48)
176     0.000 0.000     PDEP (AGE = 49)
177     0.000 0.000     PDEP (AGE = 50)
178     0.000 0.000     PDEP (AGE = 51)
179     0.000 0.000     PDEP (AGE = 52)
180     0.000 0.000     PDEP (AGE = 53)
```

```
0.000 0.000     PDEP (AGE = 54)
0.000 0.000     PDEP (AGE = 55)
0.000 0.000     PDEP (AGE = 56)
0.000 0.000     PDEP (AGE = 57)
0.000 0.000     PDEP (AGE = 58)
0.000 0.000     PDEP (AGE = 59)
0.000 0.000     PDEP (AGE = 60)
0.000 0.000     PDEP (AGE = 61)
0.003 0.003     PDEP (AGE = 62)
0.000 0.000     PDEP (AGE = 63)
0.000 0.000     PDEP (AGE = 64)
0.000 0.000     PDEP (AGE = 65)
0.006 0.006     PDEP (AGE = 66)
0.000 0.000     PDEP (AGE = 67)
0.000 0.000     PDEP (AGE = 68)
0.003 0.003     PDEP (AGE = 69)
0.000 0.000     PDEP (AGE = 70)
0.000 0.000     PDEP (AGE = 71)
0.000 0.000     PDEP (AGE = 72)
0.000 0.000     PDEP (AGE = 73)
0.000 0.000     PDEP (AGE = 74)
0.000 0.000     PDEP (AGE = 75)
0.000 0.000     PDEP (AGE = 76)
0.000 0.000     PDEP (AGE = 77)
0.000 0.000     PDEP (AGE = 78)
0.000 0.000     PDEP (AGE = 79)
0.000 0.000     PDEP (AGE = 80)
0.000 0.000     PDEP (AGE = 81)
0.000 0.000     PDEP (AGE = 82)
0.000 0.000     PDEP (AGE = 83)
0.003 0.003     PDEP (AGE = 84)
0.000 0.000     PDEP (AGE = 85)
0.003 0.003     PDEP (AGE = 86)
0.00 0.20 0.25 0.50 1.00    MALES  FLEQUI
0.00 0.15 0.20 0.40 0.75  FEMALES FLEQUI
0.0156 0.0000 0.0118 0.0000    AGE CI = 1
0.0008 0.0000 0.0005 0.0000    AGE CI = 2
0.0008 0.0000 0.0005 0.0000    AGE CI = 3
0.0008 0.0000 0.0005 0.0000    AGE CI = 4
0.0008 0.0000 0.0005 0.0000    AGE CI = 5
0.0006 0.0000 0.0004 0.0000    AGE CI = 6
0.0006 0.0000 0.0004 0.0000    AGE CI = 7
0.0006 0.0000 0.0004 0.0000    AGE CI = 8
0.0006 0.0000 0.0004 0.0000    AGE CI = 9
0.0006 0.0000 0.0004 0.0000    AGE CI = 10
0.0004 0.0000 0.0003 0.0000    AGE CI = 11
0.0004 0.0000 0.0003 0.0000    AGE CI = 12
0.0004 0.0000 0.0003 0.0000    AGE CI = 13
0.0004 0.0000 0.0003 0.0000    AGE CI = 14
0.0004 0.0000 0.0003 0.0000    AGE CI = 15
0.0010 0.0000 0.0004 0.0323    AGE CI = 16
0.0010 0.0000 0.0004 0.1378    AGE CI = 17
0.0010 0.0303 0.0004 0.0345    AGE CI = 18
0.0010 0.1034 0.0004 0.0000    AGE CI = 19
0.0010 0.0625 0.0004 0.0000    AGE CI = 20
0.0011 0.0768 0.0004 0.0000    AGE CI = 21
0.0011 0.0968 0.0004 0.0714    AGE CI = 22
0.0011 0.0590 0.0004 0.0000    AGE CI = 23
0.0011 0.0385 0.0004 0.0000    AGE CI = 24
0.0011 0.0000 0.0004 0.0000    AGE CI = 25
```

```
241.    0.0008 0.0000 0.0005 0.0000   AGE CL = 26
242     0.0008 0.0000 0.0005 0.0000   AGE CL = 27
243     0.0008 0.0000 0.0005 0.0000   AGE CL = 28
244     0.0008 0.0000 0.0005 0.0000   AGE CL = 29
245     0.0008 0.0000 0.0005 0.0000   AGE CL = 30
246     0.0010 0.0435 0.0010 0.0000   AGE CL = 31
247     0.0010 0.0000 0.0010 0.0435   AGE CL = 32
248     0.0010 0.0000 0.0010 0.0000   AGE CL = 33
249     0.0010 0.0000 0.0010 0.0000   AGE CL = 34
250     0.0010 0.0000 0.0010 0.0000   AGE CL = 35
251     0.0016 0.0000 0.0011 0.0000   AGE CL = 36
252     0.0016 0.0000 0.0011 0.0000   AGE CL = 37
253     0.0016 0.0000 0.0011 0.0000   AGE CL = 38
254     0.0016 0.0000 0.0011 0.0000   AGE CL = 39
255     0.0016 0.0000 0.0011 0.0000   AGE CL = 40
256     0.0026 0.0000 0.0022 0.0000   AGE CL = 41
257     0.0026 0.0000 0.0022 0.0000   AGE CL = 42
258     0.0026 0.0000 0.0022 0.0000   AGE CL = 43
259     0.0026 0.0000 0.0022 0.0000   AGE CL = 44
260     0.0026 0.0000 0.0022 0.0000   AGE CL = 45
261     0.0040 0.0000 0.0033 0.0000   AGE CL = 46
262     0.0040 0.0000 0.0033 0.0000   AGE CL = 47
263     0.0040 0.0714 0.0033 0.0000   AGE CL = 48
264     0.0040 0.0000 0.0033 0.0000   AGE CL = 49
265     0.0040 0.0909 0.0033 0.0000   AGE CL = 50
266     0.0058 0.0000 0.0041 0.0000   AGE CL = 51
267     0.0058 0.0000 0.0041 0.0000   AGE CL = 52
268     0.0058 0.0000 0.0041 0.0000   AGE CL = 53
269     0.0058 0.0000 0.0041 0.0000   AGE CL = 54
270     0.0058 0.0000 0.0041 0.0000   AGE CL = 55
271     0.0107 0.0000 0.0066 0.0000   AGE CL = 56
272     0.0107 0.0000 0.0066 0.0000   AGE CL = 57
273     0.0107 0.0000 0.0066 0.0000   AGE CL = 58
274     0.0107 0.0000 0.0066 0.0000   AGE CL = 59
275     0.0107 0.0000 0.0066 0.0000   AGE CL = 60
276     0.0186 0.0000 0.0107 0.0000   AGE CL = 61
277     0.0186 0.0000 0.0107 0.0000   AGE CL = 62
278     0.0186 0.0000 0.0107 0.0000   AGE CL = 63
279     0.0186 0.0000 0.0107 0.0000   AGE CL = 64
280     0.0186 0.0000 0.0107 0.0000   AGE CL = 65
281     0.0295 0.0000 0.0183 0.0000   AGE CL = 66
282     0.0295 0.0000 0.0183 0.0000   AGE CL = 67
283     0.0295 0.0000 0.0183 0.0000   AGE CL =  68
284     0.0295 0.0000 0.0183 0.0000   AGE CL =  69
285     0.0295 0.0000 0.0183 0.0000   AGE CL =  70
286     0.0478 0.0000 0.0346 0.0000   AGE CL =  71
287     0.0478 0.0000 0.0346 0.0000   AGE CL =  72
288     0.0478 0.0000 0.0346 0.0000   AGE CL =  73
289     0.0478 0.0000 0.0346 0.0000   AGE CL =  74
290     0.0478 0.0000 0.0346 0.0000   AGE CL =  75
291     0.0686 0.0000 0.0564 0.0000   AGE CL =  76
292     0.0686 0.0000 0.0564 0.0000   AGE CL =  77
293     0.0686 0.0000 0.0564 0.0000   AGE CL =  78
294     0.0686 0.0000 0.0564 0.0000   AGE CL =  79
295     0.0686 0.0000 0.0564 0.0000   AGE CL =  80
296     0.1175 0.0000 0.1000 0.0000   AGE CL =  81
297     0.1175 0.0000 0.1000 0.0000   AGE CL =  82
298     0.1175 0.0000 0.1000 0.0000   AGE CL =  83
299     0.1175 0.0000 0.1000 0.0000   AGE CL =  84
300     0.1175 0.0000 0.1000 0.0000   AGE CL =  85
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      0.1981 0.0000 0.1875 0.0000  AGE CL =  86
      0.060 0.060 0.060 0.060 0.060 0.234 0.234 0.234 0.234 0.234   PBIRTH
      0.272 0.272 0.272 0.272 0.272 0.252 0.252 0.252 0.252 0.252  PBIRTH
      0.201 0.201 0.201 0.201 0.201 0.110 0.110 0.110 0.110 0.110  PBIRTH
      2.60 2.35 2.10 1.80 1.55 1.25 1.05 1.00   CALAGE
      3.35 2.35 2.20 2.05 1.95 1.85 1.80 1.70 1.60 1.55  PROAGE
      1.50 1.45 1.40 1.33 1.23 1.15 1.12 1.08 1.00      PROAGE
      0.069  21   9 0.049 0.625   PMARRY AGBRME AGBRSD PINDIM PMIMIG
      0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000  PRIMAG
      0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.067 0.000 0.067  PRIMAG
      0.067 0.200 0.067 0.000 0.133 0.000 0.067 0.067 0.000 0.000  PRIMAG
      0.000 0.067 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000  PRIMAG
      0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.067 0.000  PRIMAG
      0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.067 0.000  PRIMAG
      0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000  PRIMAG
      0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000  PRIMAG
      0.000 0.000 0.000 0.000 0.000 0.000                          PRIMAG
      0.000 0.000 0.000 0.111 0.000 0.111 0.000 0.111 0.111 0.000  PRIMAG
      0.000 0.000 0.000 0.111 0.000 0.000 0.000 0.000 0.111 0.000  PRIMAG
      0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.111 0.000 0.000  PRIMAG
      0.000 0.000 0.000 0.111 0.000 0.000 0.000 0.000 0.000 0.000  PRIMAG
      0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000  PRIMAG
      0.000 0.000 0.111 0.000 0.000 0.000 0.000 0.000 0.000 0.000  PRIMAG
      0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000  PRIMAG
      0.000 0.000 0.000 0.000 0.000 0.000                          PRIMAG
      2550 38.0 25.0   54.40  326.40 0.50  CALMIN PROMIN ANPMIN CHPCMI CHPFMI CLLMAX
       820 1180 1355 1540 1695 1830 1955 2075 2185 2295 2400 2475 2550  CALREQ
      2625 2700 2750 2735 2720 2685 2610 2600 2470 2340 2080 1820      CALREQ
       11.9 12.3 15.4 19.2 23.1 26.2 26.2 25.4   PROREQ
    2360.0 0.053 0.000  RICE WITH HUSKS
       0.0 0.000 0.000  MAIZE
    3260.0 0.191 0.000  PHASEOLUS
    3360.0 0.226 0.000  VIGNA
    3440.0 0.136 0.000  BITTER MANIOC
    3440.0 0.136 0.000  SWEET MANICC
       0.0 0.000 0.000  CACAO
       0.0 0.000 0.000  PEPPER
    1000.0 0.000 0.000  CALORIES
       0.0 1.000 0.000  TOTAL PROTEIN
       0.0 0.000 1.000  ANIMAL PROTEIN
       0.0 0.000 0.000  CATTLE
    2396.0 0.189 0.189  CHICKENS
    1160.0 0.210 0.210  GAME
       0.0 0.000 0.000  PIGS
    4220.0 0.150 0.150  PORK
    2500.0 0.210 0.210  CANNED MEAT (BEEF)
       303.0 1.00 0.63 0.49 0.49 0.49 4.84 8.68 39.72 0.14 0.54 PASTURE
     100.0   9.0  ELLIM
       25   50  100    0   10   25   DOSPCA   PHOSPHORUS
       25   50  200    0   10   50   DOSPCA   POTASSIUM
       10   20   50                  DOSPCA   NITROGEN
        0    0    0                  DOSPCA   MANURE
       70  100  150  300   30   40   50  100  DOSEPE  PHOSPHORUS
       60   80  100  200    0    0   25   50   DOSEPE  POTASSIUM
       40   60   80  100                      DOSEPE  NITROGEN
     2222 2222 2222 2222                      MANURE DOSEPE
       0.430   5.900   2.600   5.910   0.430      PRICFE
    0.250 0.539 0.000405 0.009 2000 0.0568 -6.41   PFERT SLOLI CONSLI ALLIME SLOPHO
     24   3 1041  148 0.11 0.00 0.00 0.00 0.11 0.08 0.08 0.29 0.11 0.11 0.11 0.00
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361      0.20    DEPREC
362      0.169 0.221    SMIYPR VITYPR
363       15.0   15.0   15.0   15.0   15.0   20.0   15.0   20.0   20.0   15.0   15.0   15.0 COLAR
364       2.44   0.84   1.25   0.24   BUYME BUYSD SELLME SELLSD  (RICE)
365       0.85   0.13   0.74   0.24   BUYME BUYSD SELLME SELLSD  (MAIZE)
366      10.62   4.15   3.64   1.17   BUYME BUYSD SELLME SELLSD  (PHAS.)
367       8.85   3.46   3.02   0.98   BUYME BUYSD SELLME SELLSD  (VIGNA)
368       2.90   0.60   1.31   0.00   BUYME BUYSD SELLME SELLSD  (BIT. MAN.)
369       2.90   0.60   1.31   0.00   BUYME BUYSD SELLME SELLSD  (SWEET MAN.)
370       0.00   0.00   6.00   0.00   BUYME BUYSD SELLME SELLSD  (CACAO)
371       0.00   0.00   7.52   0.00   BUYME BUYSD SELLME SELLSD  (PEPPER)
372       0.84   0.00   0.00   0.00   BUYME BUYSD SELLME SELLSD  (CALORIES (CR$/1000 CAL/YR))
373     248.64   0.00   0.00   0.00   BUYME BUYSD SELLME SELLSD  (TOTAL PROTEIN (CR$/KG/YR))
374     248.64   0.00   0.00   0.00   BUYME BUYSD SELLME SELLSD  (ANIMAL PROTEIN (CR$/G/CAP/YR))
375      10.00   0.00   5.34   0.00   BUYME BUYSD SELLME SELLSD  (CATTLE)
376      33.32   4.44  25.32   0.00   BUYME BUYSD SELLME SELLSD  (CHICKENS)
377       9.23   2.18   9.23   2.18   BUYME BUYSD SELLME SELLSD  (GAME)
378       0.00   0.00   0.00   0.00   BUYME BUYSD SELLME SELLSD  (---)
379       0.00   0.00   0.00   0.00   BUYME BUYSD SELLME SELLSD  (---)
380      14.93   4.53   0.00   0.00   BUYME BUYSD SELLME SELLSD  (CANNED MEAT)
381       2.0   CONMAX
382     0.053 17788 20344 0.011   492   121 PCRECD, CRECME, CRECSD, PCSENT, CSENME, CSENSD
383     0.43 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00  PSELLB
384     0.25 0.10  PRVCLP  PPLPAY
385     29.6 12.6 29.2  8.1  SEED
386     0.12 0.08 75.1 33.3  TRANME TRANSD ETECME ETECSD
387     0.0744 0.581  CHICMZ  CWASTE
388      176.01 176C.51TUBCAL TUBTP
389     1.00C 1.000 0.271  BURNPB
390     1636    0  36.00
391     1418    0  18.00
392      647    0   1.00
393      647    0   1.00
394     3477    0  32.89
395     3477    0  32.89
396     1600    0  24.00
397     5500    0   0.00
398       11    0   1.74
399        0.02       0       0       0       0       0       0       0       0 ENTREPRENEURS ORIGINAL
400        0.17    5265   11431     46C    4210    1160    4210     285    1067  IND. FARMERS ORIGINAL
401        0.22    1768    3186       0       0       0       0      97     456 ART. FARMERS ORIGINAL
402        0.59    2360    6958       0       0       0       0       0       0  LABORERS ORIGINAL
403        0.11    7849   11099       C       0       0       0       0       0 ENTREPRENEURS NEWCOMERS
404        0.53   26292   30257    1174    3523    2979    6533     587    1762 IND.FARMERS NEWCOMER
405        0.05       0       0       0       0       0       0       0       0  ART.FARMERS NEWCOMERS
406        0.31    1383    2461       0       0       0       0       0       0 LABORERS NEWCOMER
407     0.50 0.00 0.50 0.00  UNMODE ENTREPRENEURS
408     0.55 0.30 0.15 0.00  UNMODE  INDEPENDENT FARMERS
409     0.79 0.17 0.00 0.04  UNMODE  ARTISAN FARMERS
410     0.85 0.07 0.03 0.05  UNMODE   LABORERS
411     0.36 C.17 0.46 0.40 0.22 C.25 C.12 0.13  PRINME PRINSD
412     0.33 0.11 0.38 0.39 0.33 C.25 0.04 C.09 0.17 0.00 0.17 0.06 0.17 0.11 0.04 0.09
413      31   42   31   42      16.2500       0.0000 DAILY WAGE LABOR
414      18   12   18   12       0.0920       0.7754  ENTERPRISE
415      34   23   34   23    842C.5000    1142.0000  GOVERNMENT OR PROFESSION
416     217  205  109  229    6346.2000    6525.8000  WORKING WOMEN OR CHILDREN
417     0.143 0.063 C.20C 0.012 0.143 0.057 C.105 0.022  PLEAVE
418     0.74 0.38 0.33 0.05 0.07 C.00 0.22 0.04 0.00 0.00 0.03 0.05 0.00 0.00 PILCME
419      1 1.13 1500     0 1500     C  800     0  800     0 6667     0 6667     0 SUBSISDATA
420      140.6 195.5  39.3  61.7  61.71615.3 SUKGRI SUKGMZ SUKGBE SUKGNN SUKGMT SUCASH
```

EXAMPLE COMMANDS FOR INTERACTIVE RUNS OF KPROG2

The following hypothetical interchange illustrates the use of KPROG2 using the MTS operating system. Items in lower case are entered by the user at the terminal; items in upper case are printed by the computer. The pound sign prompt (" # ")is printed by the computer to indicate readiness for a command to the MTS operating system; input without the pound sign prompt is directed to KPROG2. The example assumes that the compiled object code for KPROG2 with all subprograms is in the file "OBJECTFILE", the input data is in the file "BANKDATA", and the files "OUT1", "OUT2", "OUT3", "OUT4", "OUT5", and "OUT6" are empty files to receive the output. Input/output devices 5 and 6 are assumed to default to the terminal.

```
#$run objectfile sprint=out1 7=out4 8=out5 9=out6 12=out1 13=out2 -
  14=bankdata 15=out3
EXECUTION BEGINS
ENTER RUN NUMBER (FMT = I3)
  1
ENTER RUN TYPE:  1=DETERMINISTIC; 2=STOCHASTIC (FMT=I1)
2
ENTER POPULATION SECTOR CODE: 1=FROZEN 2=DYNAMIC (FMT=I1)
2
ENTER NUMBER OF YEARS TO SIMULATE (FORMAT=I5)
   25
ENTER NUMBER OF LOTS (FORMAT=I5)
   10
ENTER NUMBER OF PATCHES PER LOT (FORMAT=I5)
```

```
ENTER OUTPUT REQUEST: 1=PLOT AND LIST, 2=LIST ONLY
  (FORMAT=I1)
1
ENTER LAND USE REQUEST:  1=YES 2=NO (FMT=I1)
1
ENTER SIZE OF LOT IN HECTARES (FMT=F4.0)
  25
ENTER SEED ("0" OR ODD) FOR RANDOM NO. GENERATION
 ("0" FOR AUTOMATIC), FMT=I7
1234567
EXECUTION TERMINATED
#
```

OUTPUT FORMATS
AND EXAMPLES FOR KPROG2

OUT1

(on logical input/output unit 12): plotted output from subroutine OUTPUT.

Contains the following plots:

Calories per capita: proportion below standard vs. year

Total protein per capita: proportion below standard vs. year

Animal protein per capita: proportion below standard vs. year

Cash standard of living per capita: proportion below standard vs. year

Cash standard of living per family: proportion below standard vs. year

Proportion of lots with clearing over maximum limit

Proportion of total area cleared

Area-wide average calories per capita (Kcal/person/day) vs year

Area-wide average total protein per capita (g/person/day) vs year

Area-wide average animal protein per capita (g/person/day) vs year

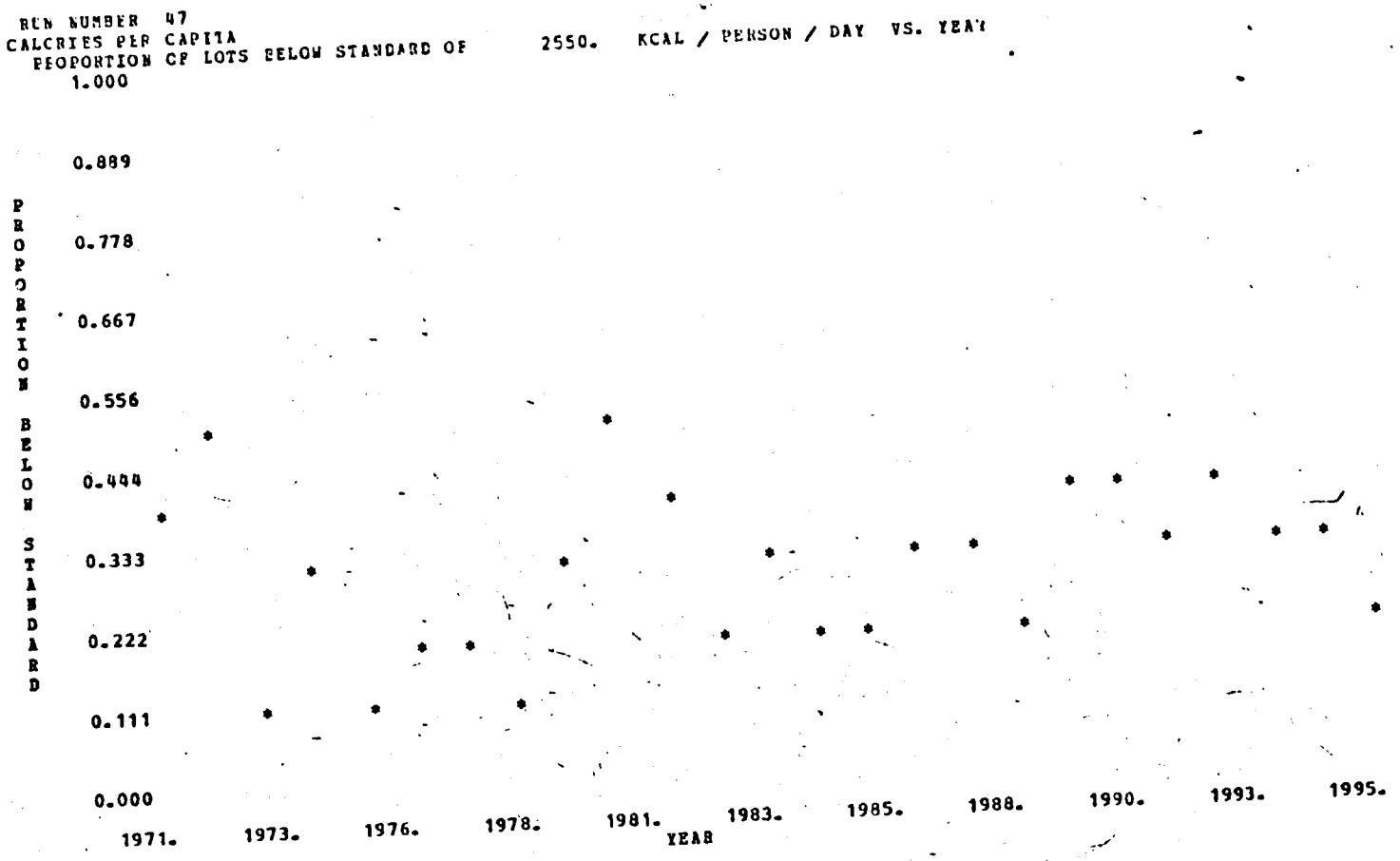
Area-wide average per-capita cash standard of living (Cruzeiros of Jan. 1, 1975/person/month) vs. year

Area-wide average per family cash standard of living (minimum wages/family/month) vs. year

Population density (persons/km^2) vs. year

Proportion of original colonists remaining vs. year

OUT1 ("plotted output"): EXAMPLE PLOT



OUT2

(on logical input/output device 13): carrying capacity measures list. From routine MAIN.

RECORDS	COLUMNS	FORMAT	CONTENTS
1-8	2-120	H	Headings
9-end of file	2-5	I4	Year (years from beginning of simulation)
	8-13	F6.3	Proportion of lots below minimum standard for calories per capita
	19-24	F6.3	Proportion of lots below minimum standard for total protein per capita
	28-33	F6.3	Proportion of lots below minimum standard for animal protein per capita
	37-42	F6.3	Proportion of lots below minimum standard for cash per month per capita
	47-51	F6.3	Proportion of lots below minimum standard for minimum wages per family
	55-60	F6.3	Proportion of lots over maximum standard for permissible clearing
	63-68	F6.3	Proportion of total area cleared
	71-76	F6.0	Area-wide average calories per capita (Kcal/person/day)
	81-86	F6.1	Area-wide average total protein per capita (g/person/day)
	91-96	F6.1	Area-wide average animal protein per capita (g/person/day)

RECORDS	COLUMNS	FORMAT	CONTENTS
	99-106	F8.2	Area-wide cash/month/capita (Cruzeiros of Jan. 1, 1975).
	109-114	F6.3	Area-wide average minimum wages per family (minimum wages per family/month)
	115-120	F6.2	Population density (persons/km^2)
	121-126	F6.3	Proportion of original colonists remaining (note: beyond margin of 120 column printer width).

Note: the value "-99." is output for missing values.

OUT2 ("carrying capacity measures list"): EXAMPLE

** RUN 47 OF KPRCG2: ALL MCBAN TYPES, FREE FALLOW, DYNAMIC POPULATION SECTOR, STOCHASTIC SIZLOT=10HA

RUN NUMBER 47

YEAR	PROPORTION OF LOTS BELOW MINIMUM STANDARD					PROP. OVER 50 % CLEAR	PROP. TOTAL AREA. CLEAR	AREA AVERAGES					POP DENS PER SQ.KM
#	CALORIES PER CAP.	TOT.PROT PER CAP.	ANIMAL PROT.PC	CASH/MO PER CAP.	MIN WAGE PER FAM			CALORIES PER CAP.	TOT.PROT PER CAP.	AN.PROT PER CAP.	CASH/MO PER CAP	MIN WAGE	
1	0.400	0.0	0.100	0.0	0.0	0.800	0.800	3756.	101.8	34.7	1039.56	6.490	55.00
2	0.500	0.0	0.400	0.100	0.100	1.000	1.000	3250.	89.4	22.3	560.78	6.597	46.00
3	0.100	0.0	0.400	0.200	0.100	1.000	1.000	3652.	94.5	25.9	361.67	3.740	48.00
4	0.300	0.0	0.300	0.200	0.300	1.000	1.000	3053.	92.6	23.4	468.36	5.809	50.00
5	0.100	0.100	0.200	0.100	0.200	1.000	1.000	4342.	102.1	33.4	909.53	8.270	52.00
6	0.200	0.0	0.400	0.300	0.200	1.000	1.000	3342.	95.6	24.5	645.58	5.224	56.00
7	0.200	0.0	0.200	0.100	0.100	1.000	1.000	3941.	101.9	29.5	591.83	5.152	60.00
8	0.100	0.0	0.300	0.200	0.100	1.000	1.000	3726.	99.8	29.7	396.31	4.676	63.00
9	0.300	0.100	0.600	0.300	0.200	1.000	1.000	3530.	83.3	21.5	345.90	3.949	57.00
10	0.500	0.0	0.200	0.100	0.100	1.000	1.000	2628.	86.7	25.9	482.35	6.037	56.00
11	0.400	0.0	0.0	0.0	0.0	1.000	1.000	4113.	107.1	38.2	497.38	5.895	54.00
12	0.200	0.0	0.300	0.200	0.200	1.000	1.000	3012.	90.4	24.6	570.18	5.856	53.00
13	0.300	0.0	0.400	0.200	0.200	1.000	1.000	3298.	90.8	23.8	1099.09	6.652	54.00
14	0.200	0.0	0.500	0.400	0.400	1.000	1.000	3445.	87.6	21.3	588.02	4.009	60.00
15	0.200	0.0	0.300	0.100	0.0	1.000	1.000	3492.	99.0	30.5	443.03	5.676	62.00
16	0.300	0.100	0.400	0.400	0.400	1.000	1.000	3014.	86.1	22.0	181.98	2.539	64.00
17	0.300	0.0	0.400	0.200	0.100	1.000	1.000	3874.	92.3	25.1	392.06	4.394	67.00
18	0.200	0.0	0.500	0.300	0.200	1.000	1.000	3072.	93.9	24.0	271.95	3.367	69.00
19	0.400	0.0	0.400	0.300	0.300	1.000	1.000	3725.	90.8	26.2	314.16	4.660	63.00
20	0.400	0.0	0.300	0.200	0.200	1.000	1.000	3230.	91.4	29.1	385.26	6.427	66.00
21	0.300	0.0	0.300	0.0	0.0	1.000	1.000	4112.	94.0	29.9	395.19	6.653	64.00
22	0.400	0.100	0.200	0.200	0.200	1.000	1.000	3374.	92.3	29.8	403.59	7.018	64.00
23	0.300	0.100	0.400	0.400	0.300	1.000	1.000	2875.	86.9	24.7	364.45	4.464	61.00
24	0.300	0.0	0.300	0.300	0.200	1.000	1.000	3332.	93.7	30.1	334.19	4.603	60.00
25	0.200	0.0	0.300	0.200	0.100	1.000	1.000	3612.	98.1	30.0	365.24	4.804	62.00

END OF FILE

OUT3

(on logical input/output device 15): land use measures list.

From routine MAIN.

RECORD	COLUMNS	FORMAT	CONTENTS
1	1-3	I3	run number
1	4-8	I5	year of simulation
1	9-14	F6.3	rice alone: proportion of study area
1	15-20	F6.3	rice alone: proportion of lots planting
1	21-26	F6.0	rice alone: average yield (kg/ha)
1	27-32	F6.3	rice interplanted: proportion of study area
1	33-38	F6.3	rice interplanted: proportion of lots planting
1	39-44	F6.0	rice interplanted: average yield (kg/ha)
1	45-50	F6.3	maize alone: proportion of study area
1	51-56	F6.3	maize alone: proportion of lots planting
1	57-62	F6.0	maize alone: average yield (kg/ha)
1	63-68	F6.3	maize interplanted: proportion of study area
1	69-74	F6.3	maize interplanted: proportion of lots planting
1	75-80	F6.0	maize interplanted: average yield (kg/ha)
2	1-3	I3	run number
2	4-8	I5	year of simulation
2	9-14	F6.3	Phaseolus: proportion of study area planted
2	15-20	F6.3	Phaseolus: proportion of lots planting

RECORD	COLUMNS	FORMAT	CONTENTS
2	21-26	F6.0	Phaseolus: average yield (kg/ha)
2	27-32	F6.3	Vigna: proportion of study area
2	33-38	F6.3	Vigna: proportion of lots planting
2	39-44	F6.0	Vigna: average yield (kg/ha)
2	45-50	F6.3	bitter manioc: proportion of study area harv
2	51-56	F6.3	bitter manioc: proportion of lots harvestin
2	57-62	F6.0	bitter manioc: average yield (kg manioc flour/ha/12 months growth)
2	63-68	F6.3	sweet manioc: proportion of study area harvested (note: only harvested area counte
2	69-74	F6.3	sweet manioc: proportion of lots harvesting
2	75-80	F6.0	sweet manioc: average yield (kg manioc flour/ha/12 months growth)
3	1-3	I3	run number
3	4-8	I5	year of simulation
3	9-14	F6.3	cacao: proportion of study area in this use
3	15-20	F6.3	cacao: proportion of lots with this use
3	21-26	F6.0	cacao: average yield (kg seeds/ha in cacao/year)
3	27-32	F6.3	pepper: proportion of study area in this use
3	33-38	F6.3	pepper: proportion of lots with this use
3	39-44	F6.0	pepper: average yield (kg/ha in pepper/year)
3	45-50	F6.3	pasture with animals: proportion of study area in this use
3	51-56	F6.3	pasture with animals: proportion of lots with this use

RECORD	COLUMNS	FORMAT	CONTENTS
3	57-62	F6.0	pasture with animals: average yield (kg cattle live weight gain/ha/year)
3	63-68	F6.3	second growth: proportion of study area in this use
3	69-74	F6.3	second growth: proportion of lots with this use (note: second growth defined as land over 8 months uncultivated)
3	75-80	F6.0	not applicable

subsequent records repeat this pattern, with three records per year of simulation.

Note: the value "-99." is output for missing values.

OUT3 ("land use measures list"): EXAMPLE

1	47	1	0.222	C.EOC	2144.	0.245	0.8C0	1718.	0.122	0.800	956.	0.237	0.800	288.
2	47	1	0.067	C.800	480.	0.C07	C.200	761.	0.115	0.800	4822.	0.025	0.500	1867.
3	47	1	0.005	C.1C0	0.	0.0	0.0	-99.	0.0	0.0	-99.	0.0	0.0	-99.
4	47	2	0.190	1.C00	1814.	0.167	1.0C0	1223.	0.220	1.000	1239.	0.165	1.000	610.
5	47	2	0.09C	C.9CC	847.	C.C17	C.100	75.	0.110	0.900	4077.	0.020	0.500	1214.
6	47	2	0.012	C.300	C.	0.C	0.0	-99.	0.0	0.0	-99.	0.0	0.0	-99.
7	47	3	0.147	1.000	1827.	0.167	1.000	1656.	0.205	1.000	845.	0.177	1.000	793.
8	47	3	0.122	C.900	364.	C.C22	C.1C0	933.	0.120	0.900	3960.	0.027	0.300	1796.
9	47	3	0.020	C.30C	C.	0.0	0.0	-99.	0.0	0.0	-99.	0.005	0.100	0.
10	47	4	0.107	1.C00	1557.	0.117	1.C00	1472.	0.047	0.400	803.	0.157	1.000	1083.
11	47	4	0.080	C.EOC	402.	0.C45	C.200	769.	0.052	0.800	3613.	0.012	0.500	1719.
12	47	4	0.020	C.300	37.	C.C	C.0	-99.	0.0	0.0	-99.	0.025	0.200	0.
13	47	5	0.090	1.000	945.	C.110	0.800	1251.	0.155	0.600	182.	0.110	0.800	139.
14	47	5	0.077	C.700	723.	C.C10	C.1C0	0.	0.067	0.700	3719.	0.012	0.200	1481.
15	47	5	0.025	0.300	16C.	0.0	0.0	-99.	0.0	0.0	-99.	0.155	0.500	0.
16	47	6	0.125	1.C00	2257.	0.152	C.9C0	1900.	0.172	0.900	742.	0.170	0.900	656.
17	47	6	0.090	C.700	293.	0.C55	C.200	145.	0.115	0.900	3476.	0.012	0.300	1400.
18	47	6	0.025	0.300	127.	0.0	0.0	-99.	0.0	0.0	-99.	0.040	0.400	0.
19	47	7	0.127	1.C00	2237.	C.140	1.000	1359.	0.132	0.900	1099.	0.220	1.000	894.
20	47	7	0.112	0.700	485.	C.C90	C.300	551.	0.115	1.000	3094.	0.005	0.100	930.
21	47	7	0.025	0.300	277.	C.0	0.0	-99.	0.0	0.0	-99.	0.032	0.100	0.
22	47	8	0.120	1.000	1402.	0.115	C.900	1309.	0.C80	0.600	228.	0.180	0.900	192.
23	47	8	0.075	C.50C	903.	0.102	C.400	351.	0.080	0.800	1801.	0.007	0.300	1568.
24	47	8	0.027	0.300	195.	0.C	0.0	-99.	0.0	0.0	-99.	0.042	0.500	0.
25	47	9	0.147	1.000	1675.	0.110	1.0C0	1450.	0.075	0.600	578.	0.145	1.000	294.
26	47	9	0.135	C.800	135.	C.C37	C.2C0	66.	0.077	0.600	2041.	0.002	0.100	2348.
27	47	9	0.027	C.300	247.	C.0	0.0	-99.	0.0	0.0	-99.	0.015	0.300	0.
28	47	10	0.130	1.C00	1487.	C.120	C.9C0	1460.	0.117	0.800	787.	0.170	0.900	320.
29	47	10	0.135	C.700	656.	0.C67	C.200	22.	0.107	0.900	3694.	0.007	0.100	1984.
30	47	10	0.027	C.300	332.	C.C	C.0	-99.	0.0	0.0	-99.	0.002	0.100	0.

OUT4

(on logical input/output device 7): annual crops and pasture soils list From routine SQOUT.

Records 1-2: headings

Records 3 - end of file:

COLUMNS	FORMAT	CONTENTS
1-3	I3	run number
4-8	I5	year of simulation
9-16	F8.3	pH: average in soils bare or in annual crops
17-24	F8.3	aluminum (Al^{+++}): average in soils bare or in annual crops (ME/100g)
25-32	F8.3	carbon: average in soils bare or in annual crops (% dry weight)
33-40	F8.3	nitrogen: average in soils bare or in annual crops (% dry weight)
41-48	F8.3	phosphorus: average in soils bare or in annual crops (ppm)
49-56	F8.3	pH: average in soils under pasture
57-64	F8.3	aluminum (Al^{+++}): average in soils under pasture (ME/100g)
65-72	F8.3	carbon: average in soils under pasture (% dry weight)
73-80	F8.3	nitrogen: average in soils under pasture (% dry weight)
81-88	F8.3	phosphorus: average in soils under pasture (ppm)

Note: the value "-99." is output for missing values.

OUT4 ("annual crops and pasture soils list"): EXAMPLE

			BABE OR ANNUAL CROPS					PASTURE				
	RUN	YR	PH	AL	C	N	P	PH	AL	C	N	P
3	47	1	6.326	0.769	1.277	0.176	2.410	4.623	0.002	1.291	0.148	2.024
4	47	2	5.467	0.800	1.187	0.152	2.535	4.757	0.008	1.288	0.147	2.052
5	47	3	5.196	0.762	1.199	0.147	2.537	4.805	0.009	1.254	0.142	2.093
6	47	4	5.026	0.667	1.052	0.127	2.515	4.857	0.099	1.254	0.142	2.093
7	47	5	4.961	0.576	1.137	0.135	2.249	4.866	0.051	1.263	0.143	2.060
8	47	6	4.874	0.597	1.045	0.127	2.232	4.887	0.0	1.276	0.144	2.091
9	47	7	4.847	0.622	1.055	0.140	2.971	4.919	0.015	1.276	0.144	2.091
10	47	8	4.643	0.686	0.990	0.116	2.186	4.940	0.055	1.276	0.144	2.091
11	47	9	4.974	0.557	1.052	0.130	2.319	4.899	0.023	1.297	0.147	2.008
12	47	10	4.816	0.623	1.030	0.123	2.706	4.907	0.019	1.292	0.146	1.994
13	47	11	4.611	0.636	0.950	0.112	1.852	4.928	0.031	1.292	0.146	1.994
14	47	12	4.481	0.704	0.929	0.104	2.297	4.941	0.042	1.292	0.146	1.994
15	47	13	4.512	0.705	0.967	0.105	2.018	4.935	0.071	1.301	0.147	2.026
16	47	14	4.359	0.487	0.709	0.074	1.874	4.946	0.014	1.301	0.147	2.026
17	47	15	4.576	0.543	0.801	0.080	2.375	4.954	0.0	1.301	0.147	2.026
18	47	16	4.404	0.612	0.852	0.096	1.948	4.960	0.023	1.301	0.147	2.026
19	47	17	4.811	0.547	0.800	0.087	2.339	4.965	0.090	1.301	0.147	2.026
20	47	18	4.788	0.359	0.911	0.105	2.163	4.969	0.037	1.301	0.147	2.026
21	47	19	4.526	0.649	0.880	0.104	2.194	4.973	0.005	1.301	0.147	2.026
22	47	20	4.762	0.541	0.944	0.110	2.981	4.976	0.031	1.301	0.147	2.026
23	47	21	4.709	0.593	0.896	0.097	2.492	4.978	0.067	1.301	0.147	2.026
24	47	22	4.932	0.558	0.993	0.120	2.948	4.979	0.025	1.301	0.147	2.026
25	47	23	4.722	0.673	0.984	0.121	2.739	4.980	0.015	1.301	0.147	2.026
26	47	24	4.597	0.676	0.879	0.100	2.331	4.981	0.055	1.301	0.147	2.026
27	47	25	4.718	0.554	0.992	0.114	2.251	4.982	0.015	1.301	0.147	2.026

END OF FILE

OUT5

(on logical input/output device 8): cacao and pepper soils list

From routine: SQOUT

Records 1-2: headings

Records 3 - end of file:

COLUMNS	FORMAT	CONTENTS
1-3	I3	run number
4-8	I5	year of simulation
9-16	F8.3	pH: average in soils under cacao
17-24	F8.3	aluminum (Al^{+++}): average in soils under cacao (ME/100g)
25-32	F8.3	carbon: average in soils under cacao (% dry weight)
33-40	F8.3	nitrogen: average in soils under cacao (% dry weight)
41-48	F8.3	phosphorus: average in soils under cacao (ppm)
49-56	F8.3	pH: average in soils under pepper
57-64	F8.3	aluminum (Al^{+++}): average in soils under pepper (ME/100g)
65-72	F8.3	carbon: average in soils under pepper (% dry weight)
73-80	F8.3	nitrogen: average in soils under pepper (% dry weight)
81-88	F8.3	phosphorus: average in soils under pepper (ppm)

Note: the value "-99." is output for missing values.

OUT5 ("cacao and pepper soils list"): EXAMPLE

			CACAO				PEPPER				
RUN	YR	PH	AL	C	N	P	PH	AL	C	N	P
47	1	7.60C	0.0	0.764	0.125	1.000	-99.000	-99.000	-99.000	-99.000	-99.000
47	2	6.051	C.000	0.667	0.117	4.476	-99.000	-99.000	-99.000	-99.000	-99.000
47	3	5.045	C.392	1.07C	0.138	3.054	-99.000	-99.000	-99.000	-99.000	-99.000
47	4	4.981	0.392	1.145	0.133	2.386	-99.000	-99.000	-99.000	-99.000	-99.000
47	5	5.07E	0.955	1.255	0.161	3.645	-99.000	-99.000	-99.000	-99.000	-99.000
47	6	4.672	0.955	1.176	0.141	1.810	-99.000	-99.000	-99.000	-99.000	-99.000
47	7	4.813	C.955	1.192	0.140	3.091	-99.000	-99.000	-99.000	-99.000	-99.000
47	8	4.60C	0.956	1.251	C.143	1.493	-99.000	-99.000	-99.000	-99.000	-99.000
47	9	4.795	0.956	1.243	0.145	3.155	-99.000	-99.000	-99.000	-99.000	-99.000
47	10	5.115	0.956	1.411	0.158	4.150	-99.000	-99.000	-99.000	-99.000	-99.000
47	11	4.735	0.956	1.343	0.160	2.308	-99.000	-99.000	-99.000	-99.000	-99.000
47	12	3.82E	1.061	C.963	0.113	1.000	-99.000	-99.000	-99.000	-99.000	-99.000
47	13	4.69C	1.364	1.251	0.127	2.888	-99.000	-99.000	-99.000	-99.000	-99.000
47	14	4.793	1.323	1.239	0.143	2.550	-99.000	-99.000	-99.000	-99.000	-99.000
47	15	4.62C	1.035	1.09E	0.127	1.000	-99.000	-99.000	-99.000	-99.000	-99.000
47	16	4.498	1.263	1.239	0.142	1.988	-99.000	-99.000	-99.000	-99.000	-99.000
47	17	4.500	1.584	1.238	0.136	2.510	-99.000	-99.000	-99.000	-99.000	-99.000
47	18	4.556	2.347	1.301	0.149	1.359	-99.000	-99.000	-99.000	-99.000	-99.000
47	19	4.035	2.347	1.055	0.120	1.000	-99.000	-99.000	-99.000	-99.000	-99.000
47	20	4.726	2.346	1.238	0.135	1.000	-99.000	-99.000	-99.000	-99.000	-99.000
47	21	4.341	2.346	1.163	0.129	1.000	-99.000	-99.000	-99.000	-99.000	-99.000
47	22	4.302	2.346	1.022	0.120	1.000	-99.000	-99.000	-99.000	-99.000	-99.000
47	23	5.282	2.346	C.85C	0.152	5.718	-99.000	-99.000	-99.000	-99.000	-99.000
47	24	4.198	2.346	0.785	0.097	1.000	-99.000	-99.000	-99.000	-99.000	-99.000
47	25	4.834	2.346	1.078	0.107	1.000	-99.000	-99.000	-99.000	-99.000	-99.000

END OF FILE

OUT6

(on logical input/output device 9): run summary

From routine: MAIN

RECORDS	COLUMNS	FORMAT	CONTENTS
1	12-14	I3	run number
2	19-21	I3	number of lots
3	19-22	I4	number of patches per lot
4	13-17	F5.1	lot size (ha)
5	15-20	F6.3	patch size (ha)
6	33-39	I7	initial number for random number generation
7	24-26	I3	number of years in run
8	48-49	I2	population sector code (1=frozen, 2=dynamic)
9	44-45	I2	run type (1=deterministic, 2=stochastic)
10-12	1-120	H	headings
13-end	1-3	I3	year of simulation
13-end	8-14	F7.3	probability of colonist failure (PCFAIL) (probability per year of colonist failure on any criterion)

OUT6 ("run summary"): EXAMPLE

```
      1     RUN NO. =  47
      2     NUMBER OF LOTS =  10
      3     PATCHES PER LOT =  40
      4     LOT SIZE =  10.0 HA.
      5     PATCH SIZE =  0.250 HA.
      6     INITIAL VALUE FOR RANDOM NO. = 5555555
      7     NO. OF YEARS IN RUN =  25
      8     POPULATION SECTOR CODE (1=FROZEN 2=DYNAMIC) =  2
      9     RUN TYPE (1=DETERMINISTIC 2=STOCHASTIC) =  2
     10
     11
     12     YEAR  PCFAIL
     13      1     0.400
     14      2     0.500
     15      3     0.400
     16      4     0.600
     17      5     0.200
     18      6     0.500
     19      7     0.300
     20      8     0.400
     21      9     0.700
     22     10     0.500
     23     11     0.400
     24     12     0.500
     25     13     0.600
     26     14     0.600
     27     15     0.500
     28     16     0.600
     29     17     0.400
     30     18     0.600
     31     19     0.700
     32     20     0.700
     33     21     0.600
     34     22     0.400
     35     23     0.600
     36     24     0.600
     37     25     0.500
END OF FILE
```

OUTPUT PLOTTING ROUTINES:

DESCRIPTIONS, FORTRAN SOURCE LISTINGS, AND OUTPUT EXAMPLES

OUTGRAPH

Purpose: Produces plotted output on the line printer of carrying capacity measures. These plots are generated in KPROG2 runs (where plotted output is requested) by the OUTPUT subroutine on input/output device 12 ("OUT1").

Input units:
- 5 = MTS pseudodevice *SOURCE* (the terminal or card reader)
- 17 = OUT2 (the output list from the KPROG2 MAIN program which is output on logical input/output unit 13 in a run of KPROG2 ("carrying capacity measures list").

Output units:
- 6 = MTS pseudodevice *SINK* (the terminal or line printer) (for prompts or error messages).
- 12 = OUT1 (either the line printer or a file for plotted output (for headings of plots).
- SPRINT = OUT1 (either the line printer or a file to receive plotted output). This is for plots produced by MTS system subroutines. "SPRINT" is a MTS pseudodevice name.

Subprograms: OUTPUT (see KPROG2 subprograms).

MTS system subroutines used: ERROR, PLOT1, PLOT2, PLOT3, PLOT4, PRCHAR

Program size: 816 bytes (MAIN program only)

Input data formats: 1) for input/output device 5 (the terminal or card reader). Note: prompts are given with formats if run interactively from the terminal.

RECORD	FORMAT	CONTENTS
1	I3	number of years in OUT2 (file for input on logical input/output device 17) "carrying capacity measures list".
2	I3	Run number.

2) for input/output device 17 (OUT2): see output formats for KPROG2 ("carrying capacity measures list").

3) KPROG2 input parameters assigned in OUTGRAPH: CALMIN, PROMIN, ANPMIN, CHPFMI, CLLMAX

Plots produced: Calories per capita: proportion below standard vs. year

Total protein per capita: proportion below standard vs. year

Animal protein per capita: proportion below standard vs. year

Cash standard of living per capita: proportion below standard vs. year

Cash standard of living per family: proportion below standard vs. year

Proportion of lots with clearing over maximum limit vs. year

Proportion of total area cleared vs. year

Area-wide average calories per capita (Kcal/person/day) vs. year

Area-wide average total protein per capita (g/person/day) vs. year

Area-wide average animal protein per capita (g/person/day) vs. year

Area-wide average per capita cash standard of living (Cruzeiros of Jan. 1, 1975) vs. year

Area-wide average per family cash standard of living (Minimum wages/family) vs. year

Population density (Persons/km^2) vs. year

Proportion of original colonists remaining vs. year

EXAMPLE PLOT: see OUT1 example plot for KPROG2 output.

```
      C      "OUTGRAPH": PROGRAM FOR PLOTTING CARRYING CAPACITY
      C      MEASURES FROM EACH RUN VERSUS TIME
      C      INPUT UNITS: 5="SOURCE" 17=-OUT2
      C      OUTPUT UNITS: 12=-CUT1 6="SINK"
            COMMON/STAND/ CALMIN, PROMIN, ANPMIN, CHPFMI, CHPCMI, CLLMAX,
           1 STORC(14, 50)
            CALMIN = 2550.
            PROMIN = 38.0
            ANPMIN = 25.0
            CHPFMI = 326.40
            CHPCMI = 54.40
            CLLMAX = 0.50
            WRITE (6, 1001)
     1001 FORMAT(1X, 'ENTER NO. OF YEARS IN -OUT2 (FMT=I3)')
            READ (5, 1002) IYRS
     1002 FORMAT(I3)
            WRITE (6, 3033)
     3033 FORMAT(1X, 'ENTER RUN NUMBER (FMT=I3)')
            READ (5, 3034) NORUN
     3034 FORMAT(I3)
            READ (17, 1111)
     1111 FORMAT(7(/))
            DO 100 J=1,IYRS
            READ (17, 1010) STORC(1, J), STORC(2, J), STORC(3, J),
           1 STORC(4, J), STORC(5, J), STORC(6, J), STORC(7, J),
           2 STORC(8, J), STORC(9, J), STORC(10, J), STORC(11, J),
           3 STORC(12, J), STORC(13, J), STORC(14, J)
     1010 FORMAT(7X, F6.3, 5X, 4(F6.3, 3X), 2(F6.3, 2X),
           1 F6.0, 4X,
           1 F6.1, 4X, F6.1, 2X, F6.2, 2X, F6.3, F6.2, F6.3)
      100 CONTINUE
            CALL OUTPUT(IYRS, NORUN)
            RETURN
            END
END OF FILE
```

SOILPLOT

Purpose: produces plotted output on the line printer of soil quality measures for soils under annual crops and pasture.

Input units: 5 = MTS pseudodevice *SOURCE* (the terminal or line printer).

7 = OUT4 (the output list from the SQOUT subroutine of KPROG2 which is output on logical input/output unit 7 in a run of KPROG2 or AGRISIM).

Output units: 6 = MTS pseudodevice *SINK* (the terminal or line printer) (for prompts and error messages).

12 = OUT1 (either the line printer o- a file for receiving plotted output) (for headings of plots).

SPRINT = OUT1 (either the line printer or a file for receiving plotted output) (for plots produced by MTS system subroutines)."SPRINT" is a MTS pseudodevice name.

Subprograms: none

MTS system subroutines used: ERROR, PLOT1, PLOT2, PLOT3, PLOT4, PRCHAR

Program size: 5492 bytes

Input data formats:

1) for input/output device 5 (the terminal or card reader).

Note: prompts are given with formats if run interactively from the terminal.

RECORD	FORMAT	CONTENTS
1	I3	Number of years in OUT4 (file for input on logical input/output unit 7)

(Input data formats, continued)

(logical input/output device 5, continued)

RECORD	FORMAT	CONTENTS
2	I1	Crop request: 1=all crops, 2=annual crops only, 3=pasture only.

2) for logical input/output device 7 (OUT4): see output formats for KPROG2 ("annual crops and pasture soils list").

Plots produced: pH: average in fields bare or in annual crops vs. year

Aluminum (Al^{+++} in ME/100g):average in fields bare or in annual crops vs. year

Carbon (% dry weight): average in fields bare or in annual crops vs. year

Nitrogen (% dry weight): average in fields bare or in annual crops vs. year

Phosphorus (ppm): average in fields bare or in annual crops vs. year

pH: average in pasture soils vs. year

Aluminum (Al^{+++} in ME/100g): average in pasture soils vs. year

Carbon (% dry weight): average in pasture soils vs. year

Nitrogen (% dry weight): average in pasture soils vs. year

Phosphorus (ppm): average in pasture soils vs. year

```
C      "SOILPLOT": PROGRAM FOR PRODUCING PLOTTED OUTPUT OF
C      SOIL QUALITY MEASURES OUTPUT BY SOCUT.
C      INPUT UNITS ARE: 5=*SOURCE* 7=OUT4
C      OUTPUT UNITS ARE: 6=*SINK* 12=OUT1 SPRINT=OUT1
       INTEGER ICHAR/'*    '/
       INTEGER NSCALE(5)/ 1, 0, 3, 0, 0/
       INTEGER CHARS/Z40404000/
       REAL YMIN(10)/3.5, 0., 0., 0., 1., 3.5, 0., 0.,
     1 0., 1./
       REAL YMAX(10)/ 5., 45., 2.25, 0.9, 10., 8.,
     1 45., 2.25, 0.9, 10./
       DIMENSION ELEM(10, 50), ELEMYR(50)
       DIMENSION YR70(50)
       CALL PRCHAR(CHARS)
       WRITE (6, 4000)
 4000  FORMAT(1X, 'ENTER NO. OF YEARS IN  OUT4 (FMT=I3)')
       READ (5, 4001) IYEARS
 4001  FORMAT(I3)
       WRITE (6, 4005)
 4005  FORMAT(1X, 'ENTER CROP REQUEST: 1=ALL 2=ANNUAL ONLY',
     1 / 1X, '3=PASTURE ONLY (FMT=I1)')
       READ (5, 4006) ICRREQ
 4006  FORMAT(I1)
       READ (7, 4003) NORUN, (ELEM(IE, 1), IE=1,10)
 4003  FORMAT(// I3, 5X, 10F8.3)
       DO 600 IY=2,IYEARS
  600  READ (7, 4004)(ELEM(IE, IY), IE=1,10)
 4004  FORMAT(8X, 10F8.3)
       MAXYR = 1970 + IYEARS
       DO 100 IY = 1, IYEARS
  100  YR70(IY) = FLOAT(IY + 1970)
       DO 101 IEL=1,10
       IF (ICRREQ .EQ. 2 .AND. IEL .GT. 5) GO TO 101
       IF (ICRREQ .EQ. 3 .AND. IEL .LE. 5) GO TO 101
       DO 300 IYR=1,IYEARS
  300  ELEMYR(IYR) = ELEM(IEL, IYR)
       WRITE (12, 1000) NORUN
 1000  FORMAT('1', 1X, 'RUN NUMBER ', I3, 1X, /, 1X)
       GO TO (201, 202, 203, 204, 205, 206, 207, 208, 209,
     1 210), IEL
       CALL ERROR
  201  WRITE (12, 1001)
 1001  FORMAT(1X, 'PH: AVERAGE IN FIELDS BARE OR IN ANNUAL CROPS')
       GO TO 700
  202  WRITE (12, 1002)
 1002  FORMAT(1X, 'ALUMINUM: AVERAGE IN FIELDS BARE OR IN',
     1 1X, 'ANNUAL CROPS (ME / 100 G)')
       GO TO 700
  203  WRITE (12, 1003)
 1003  FORMAT(1X, 'CARBON: AVERAGE FOR FIELDS BARE OR IN ANNUAL CROPS',
     1 1X, '(% DRY WT.)')
       GO TO 700
  204  WRITE (12, 1004)
 1004  FORMAT(1X, 'NITROGEN: AVERAGE IN FIELDS BARE OR IN ANNUAL CROPS',
     1 1X, '(% DRY WT.)')
```

```
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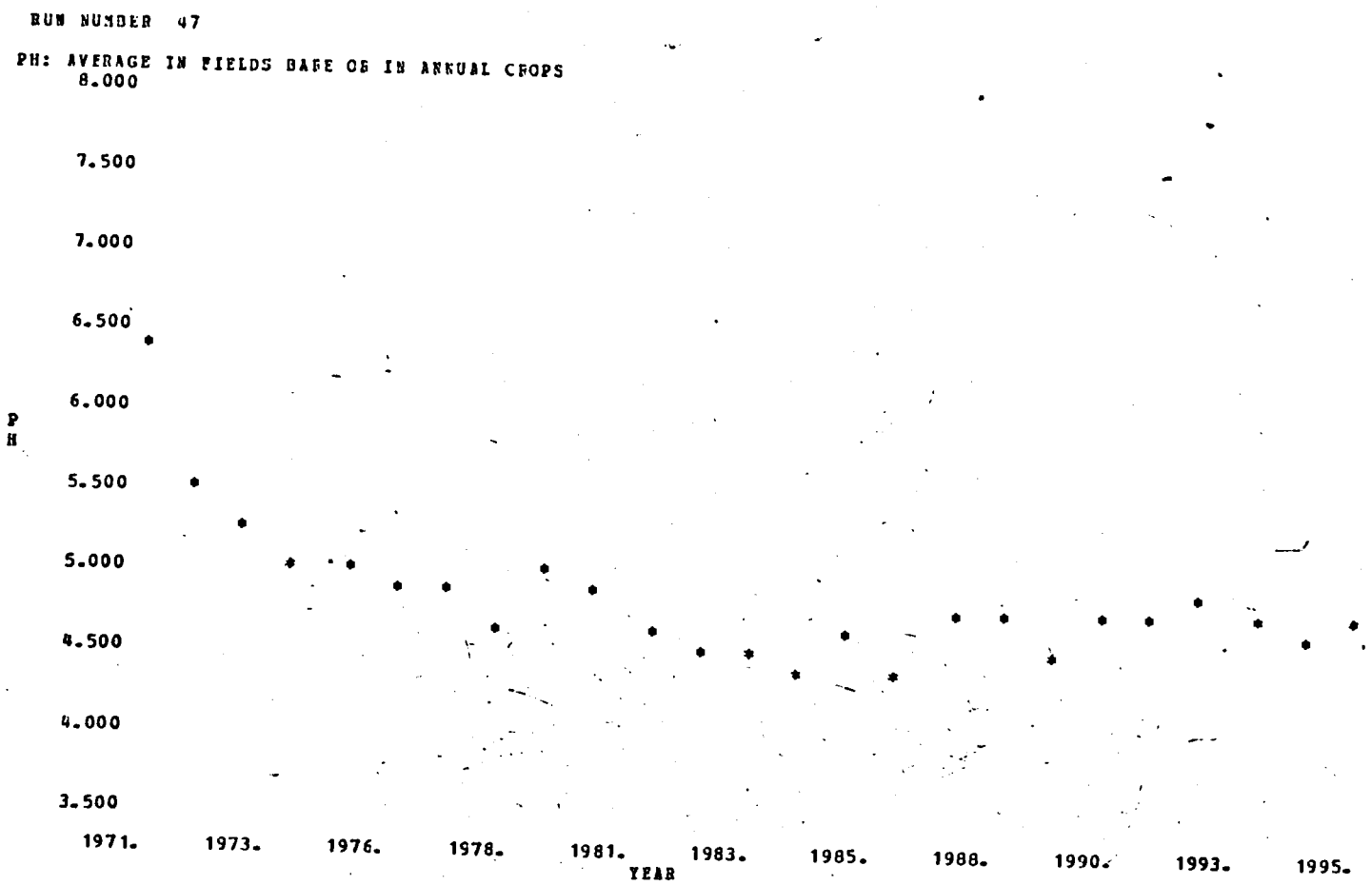
                GO TO 700
          205 WRITE (12, 1005)
         1005 FORMAT(1X, 'PHOSPHORUS: AVERAGE IN FIELDS BARE OR IN ANNUAL',
             1 1X, 'CROPS (PPM)')
                GO TO 700
          206 WRITE (12, 1006)
         1006 FORMAT(1X, 'PH:  AVERAGE IN PASTURE SOILS')
                GO TO 700
          207 WRITE (12, 1007)
         1007 FORMAT(1X, 'ALUMINUM: AVERAGE IN PASTURE SOILS (ME / 100 G)')
                GO TO 700
          208 WRITE (12, 1008)
         1008 FORMAT(1X, 'CARBON: AVERAGE IN PASTURE SOILS (% DRY WT.)')
                GO TO 700
          209 WRITE (12, 1009)
         1009 FORMAT(1X, 'NITROGEN AVERAGE IN PASTURE SOILS (% DRY WT.)')
                GO TO 700
          210 WRITE (12, 1010)
         1010 FORMAT(1X, 'PHOSPHORUS: AVERAGE IN PASTURE SOILS (PPM)')
          700 CONTINUE
                CALL PLOT1(NSCALE(1), 10, 3, 11, 9, 400)
                CALL PLOT2(0, FLOAT(MAXYR), 1971., YMAX(IEL), YMIN(IEL), 400,
             1 400, 400)
                CALL PLOT3(ICHAR, YR70(1), ELEMYR(1), IYEARS, 4, 400,
             1 400, 400)
                GO TO (500, 501, 502, 503, 504, 500, 501, 502, 503, 504), IEL
                CALL ERROR
          500 CALL PLOT4(2, 'PH', 400, 400, 400, 400, 400, 400, 400)
                GO TO 102
          501 CALL PLOT4(8, 'ALUMINUM', 400, 400, 400, 400, 400, 400, 400)
                GO TO 102
          502 CALL PLOT4(6, 'CARBON', 400, 400, 400, 400, 400, 400, 400)
                GO TO 102
          503 CALL PLOT4(8, 'NITROGEN', 400, 400, 400, 400,400, 400, 400)
                GO TO 102
          504 CALL PLOT4(10, 'PHOSPHORUS', 400, 400, 400, 400, 400, 400, 400)
          102 CONTINUE
                WRITE (12, 8002)
         8002 FORMAT(/ 53X, 'YEAR')
          101 CONTINUE
                GO TO 900
          400 WRITE (6, 8000)
         8000 FORMAT(1X, 'ERROR IN ARGUMENT FOR PLOT')
                CALL ERROR
          900 CONTINUE
                RETURN
                END
  *OPTIONS IN EFFECT*  ID,EBCDIC,SOURCE,NOLIST,NODECK,LOAD,NOMAP
  *OPTIONS IN EFFECT*  NAME = MAIN     , LINECNT =        57
  *STATISTICS*     SOURCE STATEMENTS =        88,PROGRAM SIZE =      5492
  *STATISTICS*  NO DIAGNOSTICS GENERATED

NO STATEMENTS FLAGGED IN THE ABOVE COMPILATIONS.
```

SOILPLOT: example plot



SOILPLOT2

Purpose: Produces plotted output on the line printer of soil quality measures for cacao and pepper soils.

Input units: 5 = MTS pseudodevice *SOURCE* (the terminal or card reader).

8 = OUT5 (the output list from the SQOUT subroutine of KPROG2 which is output on logical input/output unit 8 in a run of KPROG2 or AGRISIM).

Output units: 6 = MTS pseudodevice *SINK* (the terminal or line printer) (for prompts and error messages).

12 = OUT1 (either the line printer or a file for plotted output) (for headings of plots).

SPRINT = OUT1 (either the line printer or a file for plotted output) (for plots produced by MTS system subroutines). "SPRINT" is a MTS pseudodevice name.

Subprograms: none

MTS system subroutines used: ERROR, PLOT1, PLOT2, PLOT3, PLOT4, PRCHAR

Program size: 5428 bytes

Input data formats:

1) for input/output device 5 (the terminal or card reader). Note: prompts are given with formats if run interactively from the terminal.

RECORD	FORMAT	CONTENTS
1	I3	Number of years in OUT5 (file for input to SOILPLOT2 on logical input/output unit 7).
2	I1	Crop request: 1=both crops, 2=cacao only, 3=pepper only.

(Input data formats, continued)

2) for input/output device 7 (OUT5): see output formats for KPROG2 ("cacao and pepper soils list").

Plots produced:

pH: average in cacao soils vs. year

Aluminum (Al^{+++} in ME/100g): average in cacao soils vs. year

Carbon (% dry weight): average in cacao soils vs. year

Nitrogen (% dry weight): average in cacao soils vs. year

Phosphorus (ppm): average in cacao soils vs. year

pH: average in black pepper soils vs. year

Aluminum (Al^{+++} in ME/100g): average in black pepper soils vs. year

Carbon (% dry weight): average in black pepper soils vs. year

Nitrogen (% dry weight): average in black pepper soils vs. year

Phosphorus (ppm): average in black pepper soils vs. year

```
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                C     "SOILPLOT2": PROGRAM FOR PRODUCING PLOTTED OUTPUT OF                    1.000
                C     SOIL QUALITY MEASURES OUTPUT BY SCOUT FOR CACAO AND PEPPER SOILS.        2.000
                C     INPUT UNITS ARE: 5=*SOURCE* 8=OUT5                                      3.000
                C     OUTPUT UNITS ARE: 6=*SINK* 12=OUT1 SPRINT=OUT1                          4.000
0001                  INTEGER ICHAR/'*   '/                                                   5.000
0002                  INTEGER NSCALE(5)/ 1, 0, 3, 0, 0/                                       6.000
0003                  INTEGER CHARS/Z40404000/                                                7.000
0004                  REAL YMIN(10)/3.5, 0., 0., 0., 1., 3.5, 0., 0.,                         8.000
                     1 0., 1./                                                                9.000
0005                  REAL YMAX(10)/ 8., 45., 2.25, 0.9, 10., 8.,                             10.000
                     1 45., 2.25, 0.9, 10./                                                   11.000
0006                  DIMENSION ELEM(10, 50), ELEMYR(50)                                      12.000
0007                  DIMENSION YR70(50)                                                      13.000
0008                  CALL PRCHAR(CHARS)                                                      14.000
0009                  WRITE (6, 4000)                                                         15.000
0010             4000 FORMAT(1X, 'ENTER NO. OF YEARS IN  OUT5 (FMT=I3)')                      16.000
0011                  READ (5, 4001) IYEARS                                                   17.000
0012             4001 FORMAT(I3)                                                              18.000
0013                  WRITE (6, 4005)                                                         18.100
0014             4005 FORMAT(1X, 'ENTER CROP REQUEST: 1=ALL 2=CACAO ONLY',                    18.200
                     1 / 1X, '3=PEPPER ONLY (FMT=I1)')                                       18.300
0015                  READ (5, 4006) ICREQ                                                    18.400
0016             4006 FORMAT(I1)                                                              18.500
0017                  READ (8, 4003) NORUN, (ELEM(IE, 1), IE=1,10)                            19.000
0018             4003 FORMAT(// I3, 5X, 10F8.3)                                               20.000
0019                  DO 600 IY=2,IYEARS                                                      21.000
0020              600 READ (8, 4004)(ELEM(IE, IY), IE=1,10)                                   22.000
0021             4004 FORMAT(8X, 10F8.3)                                                      23.000
0022                  MAXYR = 1970 + IYEARS                                                   24.000
0023                  DO 100 IY = 1, IYEARS                                                   25.000
0024              100 YR70(IY) = FLOAT(IY + 1970)                                             26.000
0025                  DO 101 IEL=1,10                                                         27.000
0026                  IF (ICREQ .EQ. 2 .AND. IEL .GT. 5) GO TO 101                            27.300
0027                  IF (ICREQ .EQ. 3 .AND. IEL .LE. 5) GO TO 101                            27.600
0028                  DO 300 IYR=1,IYEARS                                                     28.000
0029              300 ELEMYR(IYR) = ELEM(IEL, IYR)                                            29.000
0030                  WRITE (12, 1000) NORUN                                                  30.000
0031             1000 FORMAT('1', 1X, 'RUN NUMBER ', I3, 1X, /, 1X)                           31.000
0032                  GO TO (201, 202, 203, 204, 205, 206, 207, 208, 209,                     32.000
                     1 210), IEL                                                              33.000
0033                  CALL ERROR                                                              34.000
0034              201 WRITE (12, 1001)                                                        35.000
0035             1001 FORMAT(1X, 'PH: AVERAGE IN CACAO SOILS  ')                              36.000
0036                  GO TO 700                                                               37.000
0037              202 WRITE (12, 1002)                                                        38.000
0038             1002 FORMAT(1X, 'ALUMINUM: AVERAGE IN CACAO SOILS',                          39.000
                     1 1X, '  (ME / 100 G)')                                                 40.000
0039                  GO TO 700                                                               41.000
0040              203 WRITE (12, 1003)                                                        42.000
0041             1003 FORMAT(1X, 'CARBON: AVERAGE FOR CACAO SOILS  ',                         43.000
                     1 1X, '(% DRY WT.)')                                                    44.000
0042                  GO TO 700                                                               45.000
0043              204 WRITE (12, 1004)                                                        46.000
0044             1004 FORMAT(1X, 'NITROGEN: AVERAGE IN CACAO SOILS  ',                        47.000
                     1 1X, '(% DRY WT.)')                                                    48.000
```

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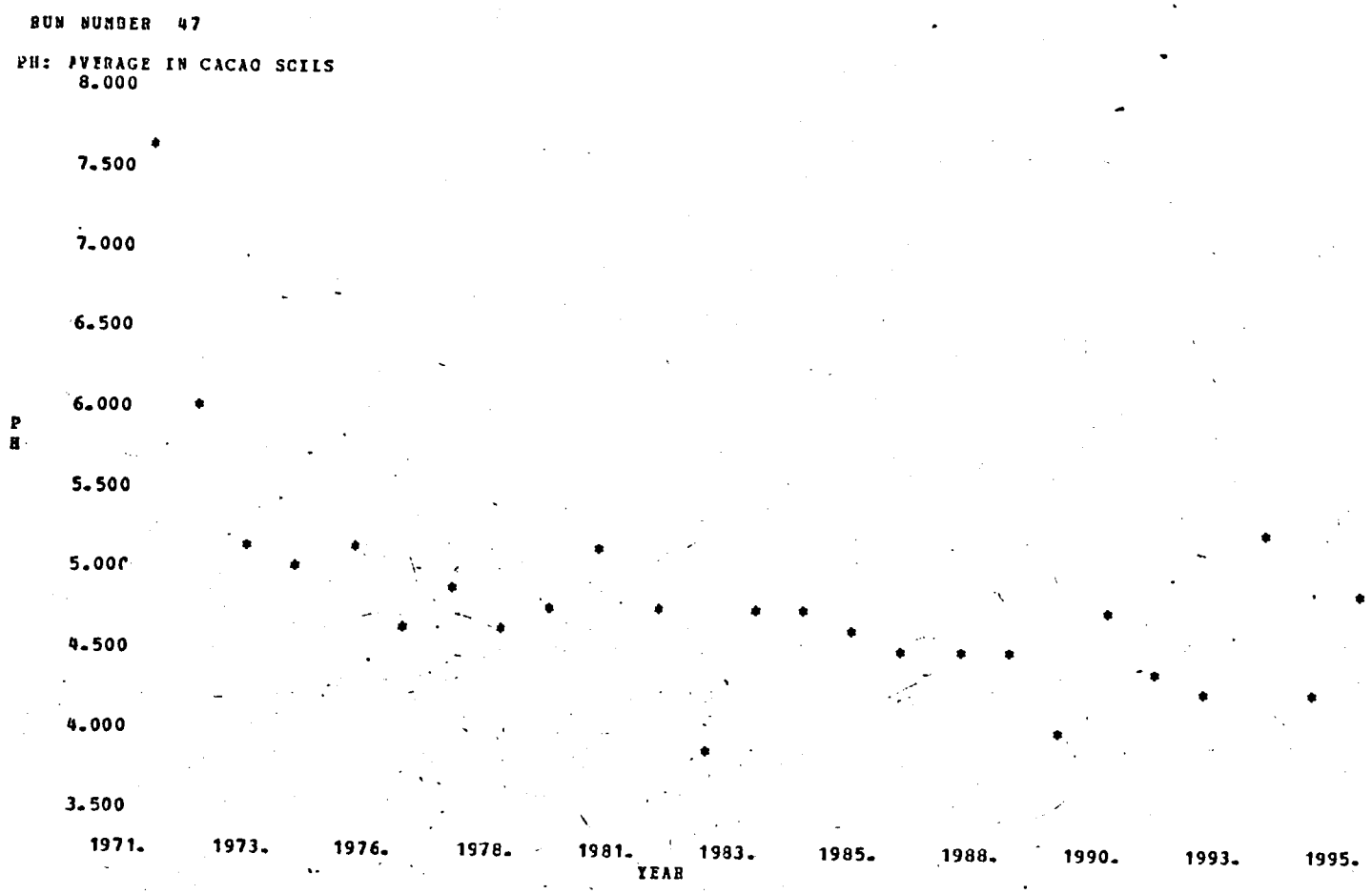
MICHIGAN TERMINAL SYSTEM FORTRAN G(21.8)              MAIN          02-18-78        16:27:26        PAGE P002

 0045              GO TO 700
 0046          205 WRITE (12, 1005)
 0047         1005 FORMAT(1X, 'PHOSPHORUS: AVERAGE IN CACAO SOILS ',
                 1 1X, ' (PPM)')
 0048              GO TO 700
 0049          206 WRITE (12, 1006)
 0050         1006 FORMAT(1X, 'PH:  AVERAGE IN BLACK PEPPER SOILS')
 0051              GO TO 700
 0052          207 WRITE (12, 1007)
 0053         1007 FORMAT(1X, 'ALUMINUM: AVERAGE IN BLACK PEPPER SOILS (ME / 100 G)')
 0054              GO TO 700
 0055          208 WRITE (12, 1008)
 0056         1008 FORMAT(1X, 'CARBON: AVERAGE IN BLACK PEPPER SOILS (% DRY WT.)')
 0057              GO TO 700
 0058          209 WRITE (12, 1009)
 0059         1009 FORMAT(1X, 'NITROGEN AVERAGE IN BLACK PEPPER SOILS (% DRY WT.)')
 0060              GO TO 700
 0061          210 WRITE (12, 1010)
 0062         1010 FORMAT(1X, 'PHOSPHORUS: AVERAGE IN BLACK PEPPER SOILS (PPM)')
 0063          700 CONTINUE
 0064              CALL PLOT1(NSCALE(1), 10, 3, 11, 9, 400)
 0065              CALL PLOT2(0, FLOAT(MAXYR), 1971., YMAX(IEL), YMIN(IEL), 400,
                 1 400, 400)
 0066              CALL PLOT3(ICHAR, YR70(1), ELEMYR(1), IYEARS, 4, 400,
                 1,400, 400)
 0067              GO TO (500, 501, 502, 503, 504, 500, 501, 502, 503, 504), IEL
 0068              CALL ERROR
 0069          500 CALL PLOT4(2, 'PH', 400, 400, 400, 400, 400, 400, 400)
 0070              GO TO 102
 0071          501 CALL PLOT4(8, 'ALUMINUM', 400, 400, 400, 400, 400, 400, 400)
 0072              GO TO 102
 0073          502 CALL PLOT4(6, 'CARBON', 400, 400, 400, 400, 400, 400, 400)
 0074              GO TO 102
 0075          503 CALL PLOT4(8, 'NITROGEN', 400, 400, 400, 400,400, 400, 400)
 0076              GO TO 102
 0077          504 CALL PLOT4(10, 'PHOSPHORUS', 400, 400, 400, 400, 400, 400, 400)
 0078          102 CONTINUE
 0079              WRITE (12, 8002)
 0080         8002 FORMAT(/ 53X, 'YEAR')
 0081          101 CONTINUE
 0082              GO TO 900
 0083          400 WRITE (6, 8000)
 0084         8000 FORMAT(1X, 'ERROR IN ARGUMENT FOR PLOT')
 0085              CALL ERROR
 0086          900 CONTINUE
 0087              RETURN
 0088              END
  *OPTIONS IN EFFECT*  ID,EBCDIC,SOURCE,NOLIST,NODECK,LOAD,NOMAP
  *OPTIONS IN EFFECT*  NAME = MAIN    , LINECNT =       57
  *STATISTICS*    SOURCE STATEMENTS =        88,PROGRAM SIZE =      5428
  *STATISTICS*  NO DIAGNOSTICS GENERATED

NO STATEMENTS FLAGGED IN THE ABOVE COMPILATIONS.
```

SOILPLOT2: example plot



YIELDPLOT

Purpose: Produces plotted output on the line printer of area-wide crop yield averages and proportions of land in different uses.

Input units:
5 = MTS pseudodevice *SOURCE* (the terminal or card reader).
15 = OUT3 (the output list from KPROG2 or AGRISIM MAIN programs which is output on logical input/output unit 15 in a run of KPROG2 or AGRISIM).

Output units:
6 = MTS pseudodevice *SINK* (the terminal or line printer) (for prompts and error messages).
12 = OUT1 (either the line printer or a file for receiving plotted output) (for headings of plots).
SPRINT = OUT1 (either the line printer or a file for receiving plotted output) (for plots produced by MTS system subroutines). "SPRINT" is a MTS pseudodevice name.

Subprograms: none

MTS system subroutines used: ERROR, PLOT1, PLOT2, PLOT3, PLOT4, PRCHAR

Program size: 10156 bytes

Input data formats:

1) for input/output device 5 (the terminal or card reader). Note: prompts are given with formats if run interactively from the terminal.

RECORD	FORMAT	CONTENTS
1	I3	Number of years in OUT3 (file for input to YIELDPLOT on logical input/output device 15).

(Input data formats, continued)

(logical input/output device 5, continued)

RECORD	FORMAT	CONTENTS
2	I1	Land use request: 1=yields only, 2=yields and land use
3	I1	Crop request: 1=all crops, 2=annual crops only, 3=pasture only, 4=cacao only, 5=pepper only

2) for logical input/output device 15 (OUT3): see output formats for KPROG2 ("land use measures list").

Plots produced:
- Rice alone: proportion of area vs. year
- Rice alone: area-wide average yield (kg/ha) vs. year
- Rice interplanted: proportion of area vs. year
- Rice interplanted: area-wide average yield (kg/ha) vs. year
- Maize alone: proportion of area vs. year
- Maize alone: area-wide average yield (kg/ha) vs. year
- Maize interplanted: proportion of area vs. year
- Maize interplanted: area-wide average yield (kg/ha) vs. year
- Phaseolus: proportion of area vs. year
- Phaseolus: area-wide average yield (kg/ha) vs. year
- Vigna: proportion of area vs. year
- Vigna: area-wide average yield (kg/ha) vs. year
- Bitter manioc: proportion of total area harvested vs. year
- Bitter manioc: area-wide average yield (kg flour/ha/year of growth) vs. year

(plots produced, continued)

Sweet manioc: proportion of total area harvested vs. year

Sweet manioc: area-wide average yield (kg flour/ha/year of growth) vs. year

Cacao: proportion of area vs. year

Cacao: area-wide average yield (kg dry seeds/ha/year) vs. year

Black pepper: proportion of area vs. year

Black pepper: area-wide average yield (kg/ha/year) vs. year

Pasture with animals: proportion of area vs. year

Cattle yield: area-wide average (kg live weight gain/ha/year) vs. year

Second growth: proportion of area

```
MICHIGAN TERMINAL SYSTEM FORTRAN G(21.8)          MAIN          02-15-78          13:42:07          PAGE P001

      C     "YIELDPLOT": PROGRAM FOR PRODUCING PLOTTED RESULTS OF                    1.000
      C     AREA-WIDE CROP YIELD AVERAGES AND PROPORTIONS OF LAND                    2.000
      C     IN DIFFERENT LAND USES                                                   3.000
      C     INPUT UNITS: 5=*SOURCE* 15=OUT3                                          4.000
      C     OUTPUT UNITS: 6=*SINK* 12=OUT1 SPRINT=OUT1                               5.000
0001        REAL YMAX(24)/1., 6750., 1., 6750., 1., 2250.,1., 2250.,                 6.000
     1 1., 2250., 1., 2250., 1., 9000., 1., 9000., 1., 4500.,                        7.000
     2 1., 4500., 1., 2250., 1., 2250./                                              8.000
0002        INTEGER ICHAR/'*   '/                                                    9.000
0003        INTEGER MSCALE(5)/ 1, 0, 3, 0, 0/                                        10.000
0004        INTEGER MSCALE(5)/ 1, 0, 0, 0, 0/                                        11.000
0005        INTEGER CHARS/Z40404000/                                                 12.000
0006        DIMENSION YR70(50)                                                       13.000
0007        DIMENSION AREA(50), YIELD(50), CAREA(12, 50), CYIELD(12, 50)             14.000
0008        CALL PRCHAR(CHARS)                                                       15.000
0009        WRITE (6, 4000)                                                          16.000
0010   4000 FORMAT(1X, 'ENTER NUMBER OF YEARS IN OUT3 (FMT=I3) ')                    17.000
0011        READ (5, 4001) IYEARS                                                    18.000
0012   4001 FORMAT(I3)                                                              19.000
0013        WRITE (6, 8001)                                                          20.000
0014   8001 FORMAT(1X, 'ENTER LAND USE REQUEST: 1=YIELDS ONLY  2=YIELDS',            21.000
     1 1X, 'AND LAND USE (FMT=I1)')                                                  22.000
0015        READ (5, 8002) LUREQ                                                     23.000
0016   8002 FORMAT(I1)                                                              24.000
0017        WRITE (6, 8004)                                                          24.100
0018   8004 FORMAT(1X, 'ENTER CROP REQUEST: 1=ALL 2=ANNUALS ONLY',                  24.200
     1 / 1X, '3=PASTURE ONLY 4=CACAO ONLY 5=PEPPER ONLY (FMT=I1) ')                  24.300
0019        READ (5, 8002) ICRREQ                                                    24.400
0020        READ (15, 4003) NORUN, (CAREA(IC, 1), CYIELD(IC, 1),                     25.000
     1IC=1,12)                                                                       26.000
0021   4003 FORMAT(I3, 5X, 4(F6.3, 6X, F6.3), 2(/ 8X, 4(F6.3, 6X, F6.3)))           27.000
0022        DO 600 J = 2, IYEARS                                                     28.000
0023    600 READ (15, 4002) (CAREA(IC, J), CYIELD(IC, J), IC=1,12)                   29.000
0024   4002 FORMAT(8X, 4(F6.3, 6X, F6.3), 2(/ 8X, 4(F6.3, 6X, F6.3)))               31.000
0025        MAXYR = 1970 + IYEARS                                                    32.000
0026        DO 100 IY = 1, IYEARS                                                    33.000
0027    100 YR70(IY) = FLOAT(IY + 1970)                                              34.000
0028        DO 101 ICR = 1,12                                                        35.000
0029        IF (ICRREQ .EQ. 1) GO TO 401                                             35.200
0030        IF (ICRREQ .EQ. 2 .AND. ICR .LE. 8) GO TO 401                            35.400
0031        IF (ICRREQ .EQ. 3 .AND. ICR .EQ. 11) GO TO 401                           35.700
0032        IF (ICRREQ .EQ. 4 .AND. ICR .EQ. 9) GO TO 401                            35.800
0033        IF (ICRREQ .EQ. 5 .AND. ICR .EQ. 10) GO TO 401                           35.900
0034        GO TO 101                                                                35.920
0035    401 CONTINUE                                                                 35.940
0036        DO 300 IYR = 1, IYEARS                                                   36.000
0037        YIELD(IYR) = CYIELD(ICR, IYR)                                            37.000
0038    300 AREA(IYR) = CAREA(ICR, IYR)                                              38.000
0039        IAR = ICR * 2 - 1                                                        39.000
0040        IYL = ICR * 2                                                            40.000
0041        IF (LUREQ .EQ. 1) GO TO 700                                              41.000
0042        WRITE (12, 1000) NORUN                                                   42.000
0043   1000 FORMAT('1', 1X, 'RUN NUMBER ', I3, 1X, /, 1X)                           43.000
0044        GO TO (201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211,            44.000
     1 212), ICR                                                                     45.000
```

```
0045              CALL ERROR                                                    46.000
0046           201 WRITE (12, 1001)                                             47.000
0047          1001 FORMAT(1X, 'RICE ALONE: PROPORTION OF AREA')                 48.000
0048              GO TO 500                                                     49.000
0049           202 WRITE (12, 1002)                                             50.000
0050          1002 FORMAT(1X, 'RICE INTERPLANTED: PROPORTION OF AREA')          51.000
0051              GO TO 500                                                     52.000
0052           203 WRITE (12, 1003)                                             53.000
0053          1003 FORMAT(1X, 'MAIZE ALONE: PROPORTION OF AREA')                54.000
0054              GO TO 500                                                     55.000
0055           204 WRITE (12, 1004)                                             56.000
0056          1004 FORMAT(1X, 'MAIZE INTERPLANTED: PROPORTION OF AREA')         57.000
0057              GO TO 500                                                     58.000
0058           205 WRITE (12, 1005)                                             59.000
0059          1005 FORMAT(1X, 'PHASEOLUS: PROPORTION OF AREA')                  60.000
0060              GO TO 500                                                     61.000
0061           206 WRITE (12, 1006)                                             62.000
0062          1006 FORMAT(1X, 'VIGNA: PROPORTION OF AREA')                      63.000
0063              GO TO 500                                                     64.000
0064           207 WRITE (12, 1007)                                             65.000
0065          1007 FORMAT(1X, 'BITTER MANIOC: PROPORTION OF TOTAL AREA',        66.000
                  1 1X, 'HARVESTED')                                           67.000
0066              GO TO 500                                                     68.000
0067           208 WRITE (12, 1008)                                             69.000
0068          1008 FORMAT(1X, 'SWEET MANIOC:',                                  70.000
                  1 2X, 'PROPORTION OF TOTAL AREA HARVESTED')                   71.000
0069              GO TO 500                                                     72.000
0070           209 WRITE (12, 1009)                                             73.000
0071          1009 FORMAT(1X, 'CACAO: PROPORTION OF AREA')                      74.000
0072              GO TO 500                                                     75.000
0073           210 WRITE (12, 1010)                                             76.000
0074          1010 FORMAT(1X, 'BLACK PEPPER: PROPORTION OF AREA')               77.000
0075              GO TO 500                                                     78.000
0076           211 WRITE (12, 1011)                                             79.000
0077          1011 FORMAT(1X, 'PASTURE WITH ANIMALS:',                          80.000
                  1 2X, 'PROPORTION OF AREA')                                  81.000
0078              GO TO 500                                                     82.000
0079           212 WRITE (12, 1012)                                             83.000
0080          1012 FORMAT(1X, 'SECOND GROWTH: PROPORTION OF AREA')              84.000
0081           500 CONTINUE                                                     85.000
0082              CALL PLOT1(NSCALE(1), 10, 3, 11, 9, 400)                      86.000
0083              CALL PLOT2(0, FLOAT(MAXYR), 1971., YMAX(IAB), 0., 400,        87.000
                  1 400, 400)                                                  88.000
0084              CALL PLOT3(ICHAR, YR70(1), AREA(1), IYEARS, 4, 400,           89.000
                  1 400, 400, 400)                                             90.000
0085              CALL PLOT4(18, 'PROPORTION OF AREA', 400,                     91.000
                  1 400, 400, 400, 400, 400)                                   92.000
0086              WRITE (12, 8003)                                              92.200
0087          8003 FORMAT(/ 53X, 'YEAR')                                        92.400
0088           700 WRITE (12, 1000) NORUN                                       93.000
0089              GO TO (301, 302, 303, 304, 305, 306, 307, 308, 309, 310,      94.000
                  1  311, 900), ICR                                            95.000
0090              CALL ERROR                                                    96.000
0091           301 WRITE (12, 2001)                                             97.000
0092          2001 FORMAT(1X, 'RICE ALONE:: AREA-WIDE AVERAGE YIELD (KG/HA)')   98.000
```

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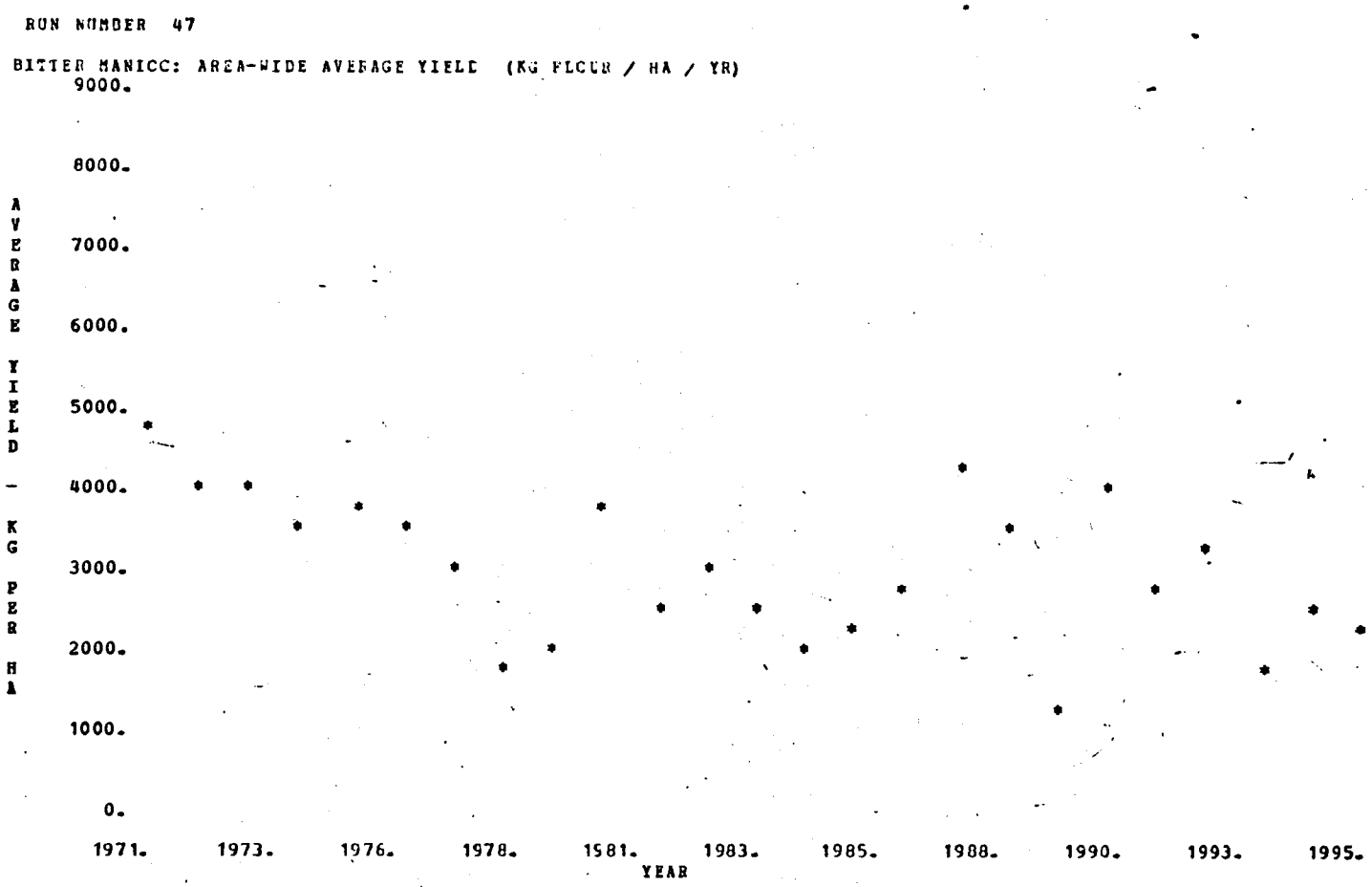
MICHIGAN TERMINAL SYSTEM FORTRAN G(21.8)              MAIN           02-15-78        13:42:07        PAGE P003
0093              GO TO 313
0094          302 WRITE (12, 2002)
0095         2002 FORMAT(1X, 'RICE INTERPLANTED: AREA-WIDE AVERAGE YIELD (KG/HA)')
0096              GO TO 313
0097          303 WRITE (12, 2003)
0098         2003 FORMAT(1X, 'MAIZE ALONE: AREA-WIDE AVERAGE YIELD (KG/HA)')
0099              GO TO 313
0100          304 WRITE (12, 2004)
0101         2004 FORMAT(1X, 'MAIZE INTERPLANTED: AREA-WIDE AVERAGE YIELD',
                 1 1X, '(KG/HA)')
0102              GO TO 313
0103          305 WRITE (12, 2005)
0104         2005 FORMAT(1X, 'PHASEOLUS: AREA-WIDE AVERAGE YIELD (KG/HA)')
0105              GO TO 313
0106          306 WRITE (12, 2006)
0107         2006 FORMAT(1X, 'VIGNA: AREA-WIDE AVERAGE YIELD (KG/HA)')
0108              GO TO 313
0109          307 WRITE (12, 2007)
0110         2007 FORMAT(1X, 'BITTER MANIOC: AREA-WIDE AVERAGE YIELD ',
                 1 1X,'(KG FLOUR / HA / YR)')
0111              GO TO 313
0112          308 WRITE (12, 2008)
0113         2008 FORMAT(1X, 'SWEET MANIOC: AREA-WIDE AVERAGE YIELD',
                 1 1X, '(KG FLOUR / HA / YEAR)')
0114              GO TO 313
0115          309 WRITE (12, 2009)
0116         2009 FORMAT(1X, 'CACAO: AREA-WIDE AVERAGE YIELD',
                 1 1X, '(KG DRY SEEDS / HA / YEAR)')
0117              GO TO 313
0118          310 WRITE (12, 2010)
0119         2010 FORMAT(1X, 'BLACK PEPPER: AREA-WIDE AVERAGE YIELD (KG / HA / YR)')
0120              GO TO 313
0121          311 WRITE (12, 2011)
0122         2011 FORMAT(1X, 'CATTLE YIELD: AREA-WIDE AVERAGE',
                 1 1X, '(KG LIVE WT. GAIN / HA / YEAR)')
0123          313 CONTINUE
            C         FOR YIELD PLOTS
0124              CALL PLOT1(MSCALE(1), 10, 3, 11, 9, 400)
0125              CALL PLOT2(0, FLOAT(MAXYR), 1971., YMAX(IYL), 0.,
                 1 400, 400, 400)
0126              CALL PLOT3(ICHAR, YR70(1), YIELD(1), IYEARS, 4, 400,
                 1 400, 400, 400, 400, 400, 400)
0127              CALL PLOT4(25, 'AVERAGE YIELD - KG PER HA', 400, 400,
                 1 400, 400, 400, 400, 400)
0128              WRITE (12, 8003)
0129          101 CONTINUE
0130              GO TO 900
0131          400 WRITE (6, 8000)
0132         8000 FORMAT(1X, 'ERROR IN ARGUMENT FOR PLOT')
0133              CALL ERROR
0134          900 CONTINUE
0135              RETURN
0136              END
 *OPTIONS IN EFFECT*  ID,EBCDIC,SOURCE,NOLIST,NODECK,LOAD,NOMAP
 *OPTIONS IN EFFECT*  NAME = MAIN    , LINECNT =       57
```

YIELDPLOT: example plot



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