

! PRODUCTION PLANNING MODEL CONSIDERING PRODUCT FORMULATION;

! Objective Function;

MAX=2350*X1+2200*X2-1000*A11*X1-2800*A12*X1-4600*A13*X1-1900*A14*X1-
3100*A15*X1-2225*A16
*X1-3175*A17*X1-2710*A18*X1-3825*A19*X1-1325*A110*X1-1000*A111*X1-
1000*A21*X2-2800*A22*X2-4600*A23*X2
-1900*A24*X2-3100*A25*X2-2225*A26*X1-3175*A27*X2-2710*A28*X2-3825*A29*X2-
1325*A210*X2-1000*A211*X2-10*X1-15*X2;

! SUPPLIER LIMITING FUNCTION

!coffee skin supplier;

A11*X1+A21*X2<=48000;

!rice bran supplier;

A12*X1+A22*X2<=61000;

!wheat bran Supplier;

A13*X1+A23*X2<=33000;

!pile Supplier;

A14*X1+A24*X2<=40000;

!dried cassava supplier;

A15*X1+A25*X2<=20000;

!Palm Kernel Expeller Supplier;

A16*X1+A26*X2<=250000;

!CGF supplier;

A17*X1+A27*X2<=37000;

!Molasses supplier;

A18*X1+A28*X2<=2300;

!copra meal supplier;

A19*X1+A29*X2<=12900;

!Corn Tumpi supplier;

A110*X1+A210*X2<=207000;

!nutshell supplier;

A111*X1+A211*X2<=173000;

! FORMULATION LIMITATION FUNCTION;

!Aij*Tkj<=Nik;

! Dry matter;

!.... dairy cow concentrate;

A11*0.7+A12*0.902+A13*0.87+A14*0.798+A15*0.795+A16*0.909+A17*0.946+A18*0.73+A
19*0.898+A110*0.88+A111*0.916>=0.86;

!.... beef concentrate;

A21*0.7+A22*0.902+A23*0.87+A24*0.798+A25*0.795+A26*0.909+A27*0.946+A28*0.73+A
29*0.898+A210*0.88+A211*0.916>=0.86;

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! ash content;
!....dairy cow concentrate;
A11*0.11+A12*0.124+A13*0.018+A14*0.024+A15*0.0469+A16*0.045+A17*0.0451+A18*0.
146+A19*0.07+A110*0.0914+A111*0.052<=0.1375;
!....beef concentrate;
A21*0.11+A22*0.124+A23*0.018+A24*0.024+A25*0.0469+A26*0.045+A27*0.0451+A28*0.
146+A29*0.07+A210*0.0914+A211*0.052<=0.146;

! crude protein;
!....dairy cow concentrate;
A11*0.0994+A12*0.1+A13*0.126+A14*0.0187+A15*0.0260+A16*0.187+A17*0.323+A18*0.
055+A19*0.235+A110*0.0804+A111*0.07>=0.13;
!....beef concentrate;
A21*0.0994+A22*0.1+A23*0.126+A24*0.0187+A25*0.0260+A26*0.187+A27*0.323+A28*0.
055+A29*0.235+A210*0.0804+A211*0.07>=0.10;

! Crude fat;
!....dairy cow concentrate;
A11*0.0197+A12*0.144+A13*0.017+A14*0.0032+A15*0.0070+A16*0.028+A17*0.102+A18*
0.01+A19*0.028+A110*0.0244+A111*0.02<=0.05;
!....beef concentrate;
A21*0.0197+A22*0.144+A23*0.017+A24*0.0032+A25*0.0070+A26*0.028+A27*0.102+A28*
0.01+A29*0.028+A210*0.0244+A211*0.02<=0.07;

!Calcium;
!....dairy cow concentrate;
A11*0.0068+A12*0.0007+A13*0.0007+A14*0.002+A15*0.0017+A16*0.0027+A17*0.00205+
A18*0.0092+A19*0.0007+A110*0.0026+A111*0.0024<=0.095;
!A11*0.0068+A12*0.0007+A13*0.0007+A14*0.002+A15*0.0017+A16*0.0027+A17*0.00205
+A18*0.0092+A19*0.0007+A110*0.0026+A111*0.0024>=0.0095;

!....beef concentrate;
A21*0.0068+A22*0.0007+A23*0.0007+A24*0.002+A25*0.0017+A26*0.0027+A27*0.00205+
A28*0.0092+A29*0.0007+A210*0.0026+A211*0.0024<=0.008;
!A21*0.0068+A22*0.0007+A23*0.0007+A24*0.002+A25*0.0017+A26*0.0027+A27*0.00205
+A28*0.0092+A29*0.0007+A210*0.0026+A211*0.0024>=0.008;

! Phosphor;
!....dairy cow concentrate;
A11*0.002+A12*0.0138+A13*0.00360+A14*0.001+A15*0.0009+A16*0.00660+A17*0.00555
+A18*0.00070+A19*0.0065+A110*0.0016+A111*0.0007<=0.006;
!A11*0.002+A12*0.0138+A13*0.00360+A14*0.001+A15*0.0009+A16*0.00660+A17*0.0055
5+A18*0.00070+A19*0.0065+A110*0.0016+A111*0.0007>=0.004;
!....beef concentrate;
A21*0.002+A22*0.0138+A23*0.00360+A24*0.001+A25*0.0009+A26*0.00660+A27*0.00555
+A28*0.00070+A29*0.0065+A210*0.0016+A211*0.0007<=0.006;
!A21*0.002+A22*0.0138+A23*0.00360+A24*0.001+A25*0.0009+A26*0.00660+A27*0.0055
5+A28*0.00070+A29*0.0065+A210*0.0016+A211*0.0007>=0.004;

!TDN;
!....dairy cow concentrate;
A11*0.506+A12*0.679+A13*0.68+A14*0.783+A15*0.785+A16*0.79+A17*0.754+A18*0.707
+A19*0.787+A110*0.5116+A111*0.48>=0.675;
!....beef concentrate;

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$A_{21} \times 0.506 + A_{22} \times 0.679 + A_{23} \times 0.68 + A_{24} \times 0.783 + A_{25} \times 0.785 + A_{26} \times 0.79 + A_{27} \times 0.754 + A_{28} \times 0.707 + A_{29} \times 0.787 + A_{210} \times 0.5116 + A_{211} \times 0.48 \geq 0.65;$

! Coarse Fiber;

!....dairy cow concentrate;

$A_{11} \times 0.1817 + A_{12} \times 0.163 + A_{13} \times 0.026 + A_{14} \times 0.089 + A_{15} \times 0.0567 + A_{16} \times 0.202 + A_{17} \times 0.173 + A_{18} \times 0.001 + A_{19} \times 0.168 + A_{110} \times 0.117 + A_{111} \times 0.659 \geq 0.16;$

!....beef concentrate;

$A_{21} \times 0.1817 + A_{22} \times 0.163 + A_{23} \times 0.026 + A_{24} \times 0.089 + A_{25} \times 0.0567 + A_{26} \times 0.202 + A_{27} \times 0.173 + A_{28} \times 0.001 + A_{29} \times 0.168 + A_{210} \times 0.117 + A_{211} \times 0.659 \geq 0.162;$

! LIMITATION FUNCTION;

$A_{11} + A_{12} + A_{13} + A_{14} + A_{15} + A_{16} + A_{17} + A_{18} + A_{19} + A_{110} + A_{111} = 1;$

$A_{21} + A_{22} + A_{23} + A_{24} + A_{25} + A_{26} + A_{27} + A_{28} + A_{29} + A_{210} + A_{211} = 1;$

$A_{11} \geq 0;$

$A_{12} \geq 0;$

$A_{13} \geq 0;$

$A_{14} \geq 0;$

$A_{15} \geq 0;$

$A_{16} \geq 0;$

$A_{17} \geq 0;$

$A_{18} \geq 0;$

$A_{19} \geq 0;$

$A_{110} \geq 0;$

$A_{111} \geq 0;$

$A_{21} \geq 0;$

$A_{22} \geq 0;$

$A_{23} \geq 0;$

$A_{24} \geq 0;$

$A_{25} \geq 0;$

$A_{26} \geq 0;$

$A_{27} \geq 0;$

$A_{28} \geq 0;$

$A_{29} \geq 0;$

$A_{210} \geq 0;$

$A_{211} \geq 0;$

$X_1 \geq 300000;$

$X_2 \geq 350000;$

END