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LAMPIRAN

LAMPIRAN 1 : Data Penggunaan Pupuk Padi di Maros dan Pangkajene Kepulauan

a. Pupuk Padi Urea Maros

Tahun	Penggunaan Pupuk Padi Urea (Ton)
2001	3880
2002	5442
2003	5464
2004	7172
2005	8227
2006	7754
2007	5152
2008	17387
2009	12500
2010	12427,5
2011	11838
2012	11899,95
2013	11401
2014	11701,6
2015	11375,3
2016	10466
2017	11888,1
2018	10805
2019	10142
2020	11900

b. Pupuk Padi Za Maros

Tahun	Penggunaan Pupuk Padi Za (Ton)
2001	513
2002	250
2003	631
2004	845
2005	1784
2006	865
2007	489
2008	2682
2009	2750
2010	1753
2011	1450
2012	489

2013	2682
2014	2750
2015	1858,8
2016	1878
2017	1904,85
2018	1901,15
2019	1891,2
2020	2049

c. Pupuk Padi SP-36 Maros

Tahun	Penggunaan Pupuk Padi SP-36 (Ton)
2001	308
2002	380
2003	742
2004	1115
2005	1654
2006	990
2007	696
2008	1322
2009	1825
2010	1796
2011	1402
2012	1422
2013	2243
2014	1474
2015	1675
2016	2154,75
2017	2692
2018	2782
2019	2657
2020	2070

d. Pupuk Padi NPK Maros

Tahun	Penggunaan Pupuk Padi NPK (Ton)
2001	240
2002	385
2003	477
2004	55

2005	254
2006	279
2007	352
2008	1248
2009	2900
2010	1393,1
2011	1004
2012	2150,5
2013	1257,5
2014	2495,1
2015	2481,4
2016	2341,4
2017	2623,9
2018	2189,05
2019	1983,8
2020	3598

e. Pupuk Padi Organik Maros

Tahun	Penggunaan Pupuk Padi Organik (Ton)
2001	0
2002	0
2003	0
2004	0
2005	0
2006	0
2007	0
2008	100
2009	100
2010	728
2011	770
2012	1426
2013	1633,48
2014	1260,76
2015	222,56
2016	157,66
2017	161,5
2018	277,5
2019	330,28
2020	313

f. Pupuk Padi Urea Pangkep

Tahun	Penggunaan Pupuk Padi Urea (Ton)
2001	904
2002	2334
2003	2356
2004	4114
2005	5269
2006	4868
2007	3332
2008	9950
2009	9250
2010	8334
2011	8268
2012	7799,2
2013	7322,95
2014	7520
2015	5935
2016	8300
2017	10381,3
2018	7807
2019	7807
2020	7726

g. Pupuk Padi Za Pangkep

Tahun	Penggunaan Pupuk Padi Za (Ton)
2001	724
2002	561
2003	842
2004	1056
2005	2320
2006	933
2007	538
2008	3371
2009	3081
2010	1130
2011	715
2012	538
2013	3371

2014	3081
2015	842,65
2016	1073
2017	1198
2018	1012
2019	1048
2020	965

h. Pupuk Padi SP-36 Pangkep

Tahun	Penggunaan Pupuk Padi SP-36 (Ton)
2001	396
2002	472
2003	945
2004	1425
2005	1956
2006	895
2007	480
2008	3419
2009	3195
2010	1410
2011	1206
2012	1965
2013	1183,5
2014	1510,68
2015	1529,82
2016	2065
2017	3190
2018	2940
2019	2408
2020	1368

i. Pupuk Padi NPK Pangkep

Tahun	Penggunaan Pupuk Padi NPK (Ton)
2001	365
2002	425
2003	518
2004	75

2005	267
2006	286
2007	393
2008	3171
2009	3900
2010	1375
2011	1298
2012	1895
2013	1590,8
2014	2204,1
2015	2249,85
2016	2883,5
2017	3305
2018	2500
2019	2268
2020	2998

j. Pupuk Padi Organik Pangkep

Tahun	Penggunaan Pupuk Padi (Ton)
2001	0
2002	0
2003	0
2004	0
2005	0
2006	0
2007	0
2008	4000
2009	4000
2010	1221
2011	415
2012	2122,6

2013	2522,6
2014	1674,52
2015	620
2016	832
2017	223
2018	140
2019	732
2020	1349

LAMPIRAN 2. Script Matlab Penggunaan Pupuk Padi di Maros dan Pangkajene Kepulauan

a. Pupuk Padi Urea Maros

```
%Stepwise model for rice_fertilizer
%halmar halide,hydrometeorology lab geophysics dept. fmipa unhas, makassar 18/10/2021 data skripsi heral
clear
clf
load Urea_Maros.txt %  20 events, lag-predictors (ENSO(4 each), IOD(4),Monsoon(4), Temperature(4), curah hujan(13)), 1 output (rice_fertilizer freq)
factors=Urea_Maros(:,1:20);
ureamaros=Urea_Maros(:,21);
tahun=Urea_Maros(:,22);
mdl = stepwiselm(factors,ureamaros,'PEnter',0.05)

%exitt
%output
%mdl =
% Linear regression model:
%     y ~ 1 + x2 + x6*x13 + x11*x13 + x12*x18 + x13*x20
%
% Estimated Coefficients:
%                        Estimate      SE       tStat       pValue
%                        _________   _______   ________   ___________
%
%     (Intercept)           29866     1802.3     16.571    1.7761e-07
%     x2    IODMAM         -889.17    256.13    -3.4716     0.0084232
%     x6    TEMPMAM         -197.8    27.566    -7.1754    9.4702e-05
```

```
%     x11   CHJJA              1047.6     88.516     11.835    2.3822e-06
%     x12   CHSON              -1844.4     65.526    -28.147    2.7416e-09
%     x13   ENSODJF            -8020.9     2758.3    -2.9079      0.019651
%     x18   MONMAM             -8001.7     674.22    -11.868    2.3322e-06
%     x20   MONSON              986.19     149.54     6.5947    0.00017032
%     x6:x13 TEMPMAM:ENSODJF   -214.95     61.963    -3.4691     0.0084544
%     x11:x13 CHJJA:ENSODJF     387.25     150.16      2.579      0.032666
%     x12:x18 CHSON:MONMAM      371.93     26.968     13.792    7.3767e-07
%     x13:x20 ENSODJF:MONSON    3161.6     421.71      7.497    6.9472e-05

% Number of observations: 20, Error degrees of freedom: 8
% Root Mean Squared Error: 167
% R-squared: 0.98,  Adjusted R-Squared: 0.997
% F-statistic vs. constant model: 669, p-value = 1.31e-10

tetapan=29866;k_IODMAM=-889.17;k_TEMPMAM=-
197.8;k_CHJJA=1047.6;k_CHSON=-1844.4;k_ENSODJF=-
8020.9;k_MONMAM=-8001.7;k_MONSON=986.19;k_xa=-
214.95;k_xb=387.25;k_xc=371.93;k_xd=3161.6

IODMAM=factors(:,2);IODMAMz=IODMAM-
mean(IODMAM)./std(IODMAM);
TEMPMAM=factors(:,6);TEMPMAMz=TEMPMAM-
mean(TEMPMAM)./std(TEMPMAM);
CHJJA=factors(:,11);CHJJAz=CHJJA-mean(CHJJA)./std(CHJJA);
CHSON=factors(:,12);CHSONz=CHSON-mean(CHSON)./std(CHSON);
ENSODJF=factors(:,13);ENSODJFz=ENSODJF-
mean(ENSODJF)./std(ENSODJF);
MONMAM=factors(:,18);MONMAMz=MONMAM-
mean(MONMAM)./std(MONMAM);
MONSON=factors(:,20);MONSONz=MONSON-
mean(MONSON)./std(MONSON);
xa=TEMPMAM.*ENSODJF;xaz=xa-mean(xa)./std(xa);
xb=CHJJA.*ENSODJF;xbz=xb-mean(xb)./std(xb);
xc=CHSON.*MONMAM;xaz=xc-mean(xc)./std(xc);
xd=ENSODJF.*MONSON;xdz=xd-mean(xd)./std(xd);

% standardized variabels
Y=ureamaros;X=[IODMAMz TEMPMAMz CHJJAz CHSONz ENSODJFz
MONMAMz MONSONz];
[B,BINT] = regress(Y,X)
%exitt
%standardized coeffs B, strength:
%A standardized beta coefficient compares the strength of the effect of each
individual independent
```

```
%variable to the dependent variable. The higher the absolute value of the beta coefficient, the stronger the effect.
% B =
%
%    -5.0146 IODMAM       1
%    -0.7678 TEMPMAM      6
%     3.1625 CHJJA        2
%    -1.3375 CHSON        4
%    -0.9590 ENSODJF      5
%     0.5725 MONMAM       7
%    -2.1242 MONSON       3

ureamaros_obs=ureamaros;
ureamaros_mod=round(tetapan+k_IODMAM.*IODMAM+k_TEMPMAM.*TEMPMAM+k_CHJJA.*CHJJA+k_CHSON.*CHSON+k_ENSODJF.*ENSODJF+k_MONMAM.*MONMAM+k_MONSON.*MONSON+k_xa.*xa+k_xb.*xb+k_xc.*xc+k_xd.*xd);
[m,n]=size(ureamaros_mod);

figure(1);
% plot(tahun,ureamaros_obs,'-ob',tahun,ureamaros_mod,'-r');
plot(tahun,ureamaros_obs,'-ob',tahun,ureamaros_mod,'-r');
%plot(tahun,yo,'-o',tahun,y3,'-r')
title('Grafik Model Prediksi Penggunaan Pupuk Padi Urea di Maros 2001-2020');
legend('Data Observasi','Data Prediksi')
% grid on
%legend('Data Observasi','Data Prediksi 3')
xlabel('Tahun');
ylabel('PupukUreamaros');

satu=ones(size(ureamaros_obs));

[m,n]=size(ureamaros_obs);
time=1:m;

t=1:m;

%exitt
t=1:m;

data=ureamaros_obs;
tetha=45;
R=[cosd(tetha) sind(tetha);-sind(tetha) cosd(tetha)];

p1s=ureamaros_mod;
dp1s=[ureamaros_obs(t) p1s(t)];
```

```
nip1s=(R*dp1s');
jp1s=nip1s(:,2);
jrk_p1s=norm(jp1s);
sjp1s=std(jp1s);
RMSE_pre1 = sqrt(mean((p1s(t)-ureamaros_obs(t)).^2));
korr_pre1=xcorr(p1s(t),ureamaros_obs(t),'coeff');
k_pre1=korr_pre1(m);
%exitt

axis('square')
xa=min(ureamaros_obs):max(ureamaros_obs);
ya=min(ureamaros_obs):max(ureamaros_obs);
% axis('square')
% xa=-1:6;
% ya=-1:6;

figure(2);
plot(data,ureamaros_mod,'o'),hold on
plot(xa,ya,'r:','LineWidth',2),hold on
xlabel('Data Observasi')
ylabel('Data Prediksi')
title('Grafik Scatterplot Penggunaan Pupuk Padi Urea di Maros 2001-2020');
text(4500,16500,'r=0.98')
text(4500,15500,'RMSE = 167')
% axis([0 20000 0 20000])
axis([min(ureamaros_obs) max(ureamaros_obs) min(ureamaros_obs) max(ureamaros_obs)])
%print -dtiff korelasi1.tif
```

b. Pupuk Padi Za Maros

```
%Stepwise model for rice_fertilizer
%halmar halide,hydrometeorology lab geophysics dept. fmipa unhas, makassar 18/10/2021 data skripsi heral
clear
clf
load Za_Maros.txt % 20 events, lag-predictors (ENSO(4 each), IOD(4),Monsoon(4), Temperature(4), curah hujan(13)), 1 output (rice_fertilizer freq)
factors=Za_Maros(:,1:20);
Zamaros=Za_Maros(:,21);
tahun=Za_Maros(:,22);
mdl = stepwiselm(factors,Zamaros,'PEnter',0.05)
%exitt
%output
%mdl =
% Linear regression model:
```

```
%     y ~ 1 + x8
%
% Estimated Coefficients:
%                      Estimate      SE       tStat       pValue
%                      _________    _______   ________   ___________
%
%     (Intercept)          3955.7     546.15     7.2429    9.7986e-07
%     x8    TEMPSON        -112.58     25.026    -4.4987    0.00027782
%
%
% Number of observations: 20, Error degrees of freedom: 18
% Root Mean Squared Error: 587
% R-squared: 0.529,  Adjusted R-Squared: 0.503
% F-statistic vs. constant model: 20.2, p-value = 0.000278

tetapan=3955.7;k_TEMPSON=-112.58

TEMPSON=factors(:,8);TEMPSONz=TEMPSON-
mean(TEMPSON)./std(TEMPSON);

% standardized variabels
Y=Zamaros;X=[TEMPSONz];
[B,BINT] = regress(Y,X)
%exitt
%standardized coeffs B, strength:
%A standardized beta coefficient compares the strength of the effect of each
individual independent
%variable to the dependent variable. The higher the absolute value of the beta
coefficient, the stronger the effect.
% B =
%
%    73.8218   TEMPSON      1

Zamaros_obs=Zamaros;
Zamaros_mod=round(tetapan+k_TEMPSON.*TEMPSON);
[m,n]=size(Zamaros_mod);

figure(1);
% plot(tahun,Zamaros_obs,'-ob',tahun,Zamaros_mod,'-r');
plot(tahun,Zamaros_obs,'-ob',tahun,Zamaros_mod,'-r');
%plot(tahun,yo,'-o',tahun,y3,'-r')
title('Grafik Model Prediksi Penggunaan Pupuk Padi Za di Maros 2001-2020');
legend('Data Observasi','Data Prediksi')
% grid on
%legend('Data Observasi','Data Prediksi 3')
xlabel('Tahun');
```

```
ylabel('PupukZaMaros');

satu=ones(size(Zamaros_obs));

[m,n]=size(Zamaros_obs);
time=1:m;

t=1:m;

%exitt
t=1:m;

data=Zamaros_obs;
tetha=45;
R=[cosd(tetha) sind(tetha);-sind(tetha) cosd(tetha)];

p1s=Zamaros_mod;
dp1s=[Zamaros_obs(t) p1s(t)];
nip1s=(R*dp1s');
jp1s=nip1s(:,2);
jrk_p1s=norm(jp1s);
sjp1s=std(jp1s);
RMSE_pre1 = sqrt(mean((p1s(t)-Zamaros_obs(t)).^2));
korr_pre1=xcorr(p1s(t),Zamaros_obs(t),'coeff');
k_pre1=korr_pre1(m);
%exitt

axis('square')
xa=min(Zamaros_obs):max(Zamaros_obs);
ya=min(Zamaros_obs):max(Zamaros_obs);
% axis('square')
% xa=-1:6;
% ya=-1:6;

figure(2);
plot(data,Zamaros_mod,'o'),hold on
plot(xa,ya,'r:','LineWidth',2),hold on
xlabel('Data Observasi')
ylabel('Data Prediksi')
title('Grafik Scatterplot Penggunaan Pupuk Padi Za di Maros 2001-2020');
text(350,2500,'r=0.529')
text(350,2300,'RMSE = 587')
% axis([0 17000 0 17000])
axis([min(Zamaros_obs) max(Zamaros_obs) min(Zamaros_obs)
max(Zamaros_obs)])
%print -dtiff korelasi1.tif
```

c. Pupuk Padi SP-36 Maros

```
%Stepwise model for rice_fertilizer
%halmar halide,hydrometeorology lab geophysics dept. fmipa unhas, makassar 18/10/2021 data skripsi heral
clear
clf
load SP36_Maros.txt % 20 events, lag-predictors (ENSO(4 each), IOD(4),Monsoon(4), Temperature(4), curah hujan(13)), 1 output (rice_fertilizer freq)
factors=SP36_Maros(:,1:20);
SP36maros=SP36_Maros(:,21);
tahun=SP36_Maros(:,22);
mdl = stepwiselm(factors,SP36maros,'PEnter',0.05)
%exitt
%output
%mdl =
% Linear regression model:
%    y ~ 1 + x6 + x7
%
% Estimated Coefficients:
%                     Estimate     SE      tStat     pValue
%                     ________   ______   _______   _________
%
%    (Intercept)        -2472.3   2335.4   -1.0586     0.30457
%    x6  TEMPMAM        -123.93   18.661   -6.6409   4.169e-06
%    x7  TEMPJJA         248.42   92.607    2.6825     0.01574
%
%
% Number of observations: 20, Error degrees of freedom: 17
% Root Mean Squared Error: 409
% R-squared: 0.722,  Adjusted R-Squared: 0.689
% F-statistic vs. constant model: 22.1, p-value = 1.89e-05

tetapan=-2472.3;k_TEMPMAM=-123.93;k_TEMPJJA=248.42

TEMPMAM=factors(:,6);TEMPMAMz=TEMPMAM-mean(TEMPMAM)./std(TEMPMAM);
TEMPJJA=factors(:,7);TEMPJJAz=TEMPJJA-mean(TEMPJJA)./std(TEMPJJA);

% standardized variabels
Y=SP36maros;X=[TEMPMAMz TEMPJJAz];
[B,BINT] = regress(Y,X)
%exitt
%standardized coeffs B, strength:
%A standardized beta coefficient compares the strength of the effect of each individual independent
```

```
%variable to the dependent variable. The higher the absolute value of the beta coefficient, the stronger the effect.
% B =
%
%   -13.6942     TEMPMAM      2
%    566.46332   TEMPJJA      1

SP36maros_obs=SP36maros;
SP36maros_mod=round(tetapan+k_TEMPMAM.*TEMPMAM+k_TEMPJJA.*TEMPJJA);
[m,n]=size(SP36maros_mod);

figure(1);
% plot(tahun,SP36maros_obs,'-ob',tahun,SP36maros_mod,'-r');
plot(tahun,SP36maros_obs,'-ob',tahun,SP36maros_mod,'-r');
%plot(tahun,yo,'-o',tahun,y3,'-r')
title('Grafik Model Prediksi Penggunaan Pupuk Padi SP36 di Maros 2001-2020');
legend('Data Observasi','Data Prediksi')
% grid on
%legend('Data Observasi','Data Prediksi 3')
xlabel('Tahun');
ylabel('PupukSP36Maros');

satu=ones(size(SP36maros_obs));

[m,n]=size(SP36maros_obs);
time=1:m;

t=1:m;

%exitt
t=1:m;

data=SP36maros_obs;
tetha=45;
R=[cosd(tetha) sind(tetha);-sind(tetha) cosd(tetha)];

p1s=SP36maros_mod;
dp1s=[SP36maros_obs(t) p1s(t)];
nip1s=(R*dp1s');
jp1s=nip1s(:,2);
jrk_p1s=norm(jp1s);
sjp1s=std(jp1s);
RMSE_pre1 = sqrt(mean((p1s(t)-SP36maros_obs(t)).^2));
korr_pre1=xcorr(p1s(t),SP36maros_obs(t),'coeff');
k_pre1=korr_pre1(m);
```

```
%exitt

axis('square')
xa=min(SP36maros_obs):max(SP36maros_obs);
ya=min(SP36maros_obs):max(SP36maros_obs);
% axis('square')
% xa=-1:6;
% ya=-1:6;

figure(2);
plot(data,SP36maros_mod,'o'),hold on
plot(xa,ya,'r:','LineWidth',2),hold on
xlabel('Data Observasi')
ylabel('Data Prediksi')
title('Grafik Scatterplot Penggunaan Pupuk Padi SP36 di Maros 2001-2020');
text(400,2500,'r=0.722')
text(400,2300,'RMSE = 409')
% axis([0 17000 0 17000])
axis([min(SP36maros_obs) max(SP36maros_obs) min(SP36maros_obs) max(SP36maros_obs)])
%print -dtiff korelasi1.tif
```

d. Pupuk Padi NPK Maros

```
%Stepwise model for rice_fertilizer
%halmar halide,hydrometeorology lab geophysics dept. fmipa unhas, makassar 18/10/2021 data skripsi heral
clear
clf
load NPK_Maros.txt %   20 events, lag-predictors (ENSO(4 each), IOD(4),Monsoon(4), Temperature(4), curah hujan(13)), 1 output (rice_fertilizer freq)
factors=NPK_Maros(:,1:20);
NPKmaros=NPK_Maros(:,21);
tahun=NPK_Maros(:,22);
mdl = stepwiselm(factors,NPKmaros,'PEnter',0.05)
%exitt
%output
%mdl =
% Linear regression model:
%    y ~ 1 + x5
%
% Estimated Coefficients:
%                   Estimate    SE      tStat     pValue
%                   ________    ______  ________  __________
%
%    (Intercept)       2878.5   248.54   11.582   8.9171e-10
```

```
%    x5  TEMPDJF          -95.203     14.331    -6.6434     3.101e-06
%
%
% Number of observations: 20, Error degrees of freedom: 18
% Root Mean Squared Error: 597
% R-squared: 0.71,  Adjusted R-Squared: 0.694
% F-statistic vs. constant model: 44.1, p-value = 3.1e-06

tetapan=2878.5;k_TEMPDJF=-95.203

TEMPDJF=factors(:,5);TEMPDJFz=TEMPDJF-
mean(TEMPDJF)./std(TEMPDJF);

% standardized variabels
 Y=NPKmaros;X=[TEMPDJFz];
 [B,BINT] = regress(Y,X)
%exitt
%standardized coeffs B, strength:
%A standardized beta coefficient compares the strength of the effect of each
individual independent
%variable to the dependent variable. The higher the absolute value of the beta
coefficient, the stronger the effect.
% B =
%
%   43.3898     TEMPDJF      1

%    NPKmaros_obs=NPKmaros;
%
NPKmaros_mod=round(tetapan+k_TEMPDJF.*TEMPDJF+k_TEMPDJF.*TEM
PDJF);
%   [m,n]=size(NPKmaros_mod);

load obsmod.txt
NPKmaros_obs=obsmod(:,1);
NPKmaros_mod=obsmod(:,2);

 figure(1);
% plot(tahun,NPKmaros_obs,'-ob',tahun,NPKmaros_mod,'-r');
plot(tahun,NPKmaros_obs,'-ob',tahun,NPKmaros_mod,'-r');
%plot(tahun,yo,'-o',tahun,y3,'-r')
title('Grafik Model Prediksi Penggunaan Pupuk Padi NPK di Maros 2001-2020');
legend('Data Observasi','Data Prediksi')
% grid on
%legend('Data Observasi','Data Prediksi 3')
xlabel('Tahun');
ylabel('PupukNPKmaros');
```

```
satu=ones(size(NPKmaros_obs));

[m,n]=size(NPKmaros_obs);
time=1:m;

t=1:m;

%exitt
t=1:m;

data=NPKmaros_obs;
tetha=45;
R=[cosd(tetha) sind(tetha);-sind(tetha) cosd(tetha)];

p1s=NPKmaros_mod;
dp1s=[NPKmaros_obs(t) p1s(t)];
nip1s=(R*dp1s');
jp1s=nip1s(:,2);
jrk_p1s=norm(jp1s);
sjp1s=std(jp1s);
RMSE_pre1 = sqrt(mean((p1s(t)-NPKmaros_obs(t)).^2));
korr_pre1=xcorr(p1s(t),NPKmaros_obs(t),'coeff');
k_pre1=korr_pre1(m);
%exitt

 axis('square')
 xa=min(NPKmaros_obs):max(NPKmaros_obs);
 ya=min(NPKmaros_obs):max(NPKmaros_obs);
% axis('square')
% xa=-1:6;
% ya=-1:6;

figure(2);
plot(data,NPKmaros_mod,'o'),hold on
plot(xa,ya,'r:','LineWidth',2),hold on
xlabel('Data Observasi')
ylabel('Data Prediksi')
title('Grafik Scatterplot Penggunaan Pupuk Padi NPK di Maros 2001-2020');
text(200,3300,'r=0.71')
text(200,3100,'RMSE = 597')
%  axis([0 17000 0 17000])
axis([min(NPKmaros_obs)max(NPKmaros_obs)min(NPKmaros_obs)
max(NPKmaros_obs)])
%print -dtiff korelasi1.tif
```

e. Pupuk Padi Organik Maros

```
%Stepwise model for rice_fertilizer
%halmar halide,hydrometeorology lab geophysics dept. fmipa unhas, makassar 18/10/2021 data skripsi heral
clear
clf
load organik_maros1.txt % 20 events, lag-predictors (ENSO(4 each), IOD(4),Monsoon(4), Temperature(4), curah hujan(13)), 1 output (rice_fertilizer freq)
factors=organik_maros1(:,1:20);
organikmaros=organik_maros1(:,21);
tahun=organik_maros1(:,22);
mdl = stepwiselm(factors,organikmaros,'PEnter',0.05)
%exitt
%output
% mdl =
%
%
% Linear regression model:
%     y ~ 1 + x11
%
% Estimated Coefficients:
%                    Estimate     SE      tStat      pValue
%                    ________   ______   ________   __________
%
%     (Intercept)      3924.8    1022.1    3.8399    0.0011999
%     x11   CHJJA     -143.29    40.551   -3.5335    0.0023733
%
%
% Number of observations: 20, Error degrees of freedom: 18
% Root Mean Squared Error: 356
% R-squared: 0.41,  Adjusted R-Squared: 0.377
% F-statistic vs. constant model: 12.5, p-value = 0.00237

tetapan=3924.8;k_CHJJA=-143.29

CHJJA=factors(:,11);CHJJAz=CHJJA-mean(CHJJA)./std(CHJJA);

% standardized variabels
Y=organikmaros;X=[CHJJAz];
 [B,BINT] = regress(Y,X)
%exitt
%standardized coeffs B, strength:
%A standardized beta coefficient compares the strength of the effect of each individual independent
```

```
%variable to the dependent variable. The higher the absolute value of the beta coefficient, the stronger the effect.
% B =
%
%    21.6399 CHJJA        1

organikmaros_obs=organikmaros;
organikmaros_mod=round(tetapan+k_CHJJA.*CHJJA);
[m,n]=size(organikmaros_mod);

 figure(1);
% plot(tahun,organikmaros_obs,'-ob',tahun,organikmaros_mod,'-r');
plot(tahun,organikmaros_obs,'-ob',tahun,organikmaros_mod,'-r');
%plot(tahun,yo,'-o',tahun,y3,'-r')
title('Grafik Model Prediksi Penggunaan Pupuk Padi Organik di Maros 2001-2020');
legend('Data Observasi','Data Prediksi')
% grid on
%legend('Data Observasi','Data Prediksi 3')
xlabel('Tahun');
ylabel('Pupuk Organik');

satu=ones(size(organikmaros_obs));

[m,n]=size(organikmaros_obs);
time=1:m;

t=1:m;

%exitt
t=1:m;

data=organikmaros_obs;
tetha=45;
R=[cosd(tetha) sind(tetha);-sind(tetha) cosd(tetha)];

p1s=organikmaros_mod;
dp1s=[organikmaros_obs(t) p1s(t)];
nip1s=(R*dp1s');
jp1s=nip1s(:,2);
jrk_p1s=norm(jp1s);
sjp1s=std(jp1s);
RMSE_pre1 = sqrt(mean((p1s(t)-organikmaros_obs(t)).^2));
korr_pre1=xcorr(p1s(t),organikmaros_obs(t),'coeff');
k_pre1=korr_pre1(m);
%exitt
```

```
 axis('square')
 xa=min(organikmaros_obs):max(organikmaros_obs);
 ya=min(organikmaros_obs):max(organikmaros_obs);
% axis('square')
% xa=-1:6;
% ya=-1:6;

figure(2);
plot(data,organikmaros_mod,'o'),hold on
plot(xa,ya,'r:','LineWidth',2),hold on
xlabel('Data Observasi')
ylabel('Data Prediksi')
title('Grafik Scatterplot Penggunaan Pupuk Padi Organik di Maros 2001-2020');
text(1200,300,'r=0.41')
text(1200,200,'RMSE = 356')
% axis([0 17000 0 17000])
axis([min(organikmaros_obs) max(organikmaros_obs) min(organikmaros_obs)
max(organikmaros_obs)])
%print -dtiff korelasi1.tif
```

f. Pupuk Padi Urea Pangkep

```
%Stepwise model for rice_fertilizer
%halmar halide,hydrometeorology lab geophysics dept. fmipa unhas, makassar
18/10/2021 data skripsi heral
clear
clf
load Urea_Pangkep.txt %   20 events, lag-predictors (ENSO(4 each),
IOD(4),Monsoon(4), Temperature(4), curah hujan(13)), 1 output (rice_fertilizer
freq)
factors=Urea_Pangkep(:,1:20);
ureapangkep=Urea_Pangkep(:,21);
tahun=Urea_Pangkep(:,22);
mdl = stepwiselm(factors,ureapangkep,'PEnter',0.05)
%exitt
%output
% mdl =
%
%
% Linear regression model:
%    y ~ 1 + x8
%
% Estimated Coefficients:
%                  Estimate    SE      tStat      pValue
%                  ________    ______  _______    __________
%
%    (Intercept)     15859    1214.3     13.06    1.2764e-10
```

```
%     x8    TEMPSON        -442.82     55.643    -7.9582    2.6403e-07
%
%
% Number of observations: 20, Error degrees of freedom: 18
% Root Mean Squared Error: 1.31e+03
% R-squared: 0.779,  Adjusted R-Squared 0.766
% F-statistic vs. constant model: 63.3, p-value = 2.64e-07

tetapan=15859;k_TEMPSON=-442.82

TEMPSON=factors(:,8);TEMPSONz=TEMPSON-
mean(TEMPSON)./std(TEMPSON);


% standardized variabels
 Y=ureapangkep;X=[TEMPSONz];
 [B,BINT] = regress(Y,X)
 %exitt
%standardized coeffs B, strength:
%A standardized beta coefficient compares the strength of the effect of each individual independent
%variable to the dependent variable. The higher the absolute value of the beta coefficient, the stronger the effect.
% B =
%
%    306.3075 TEMPSON      1

 ureapangkep_obs=ureapangkep;
 ureapangkep_mod=round(tetapan+k_TEMPSON.*TEMPSON);
[m,n]=size(ureapangkep_mod);

% Exitt
% load obsmod.txt
% ureapangkep_obs=obsmod(:,1);
% ureapangkep_mod=obsmod(:,2);


figure(1);
% plot(tahun,ureapangkep_obs,'-ob',tahun,ureapangkep_mod,'-r');
plot(tahun,ureapangkep_obs,'-ob',tahun,ureapangkep_mod,'-r');
%plot(tahun,yo,'-o',tahun,y3,'-r')
title('Grafik Model Prediksi Penggunaan Pupuk Urea di Pangkep 2001-2020');
legend('Data Observasi','Data Prediksi')
% grid on
%legend('Data Observasi','Data Prediksi 3')
xlabel('Tahun');
```

```
ylabel('Pupuk Urea');

satu=ones(size(ureapangkep_obs));

[m,n]=size(ureapangkep_obs);
time=1:m;

t=1:m;

%exitt
t=1:m;

data=ureapangkep_obs;
tetha=45;
R=[cosd(tetha) sind(tetha);-sind(tetha) cosd(tetha)];

p1s=ureapangkep_mod;
dp1s=[ureapangkep_obs(t) p1s(t)];
nip1s=(R*dp1s');
jp1s=nip1s(:,2);
jrk_p1s=norm(jp1s);
sjp1s=std(jp1s);
RMSE_pre1 = sqrt(mean((p1s(t)-ureapangkep_obs(t)).^2));
korr_pre1=xcorr(p1s(t),ureapangkep_obs(t),'coeff');
k_pre1=korr_pre1(m);
%exitt

 axis('square')
 xa=min(ureapangkep_obs):max(ureapangkep_obs);
 ya=min(ureapangkep_obs):max(ureapangkep_obs);
% axis('square')
% xa=-1:6;
% ya=-1:6;

figure(2);
plot(data,ureapangkep_mod,'o'),hold on
plot(xa,ya,'r:','LineWidth',2),hold on
xlabel('Data Observasi')
ylabel('Data Prediksi')
title('Grafik Model Prediksi Penggunaan Pupuk Urea di Pangkep 2001-2020');
text(1200,9800,'r=0.779')
text(1200,9200,'RMSE = 1310')
% axis([0 17000 0 17000])
axis([min(ureapangkep_obs) max(ureapangkep_obs) min(ureapangkep_obs)
max(ureapangkep_obs)])
%print -dtiff korelasi1.tif
```

g. Pupuk Padi Za Pangkep

```
%Stepwise model for rice_fertilizer
%halmar halide,hydrometeorology lab geophysics dept. fmipa unhas, makassar 18/10/2021 data skripsi heral
clear
clf
load Za_Pangkep1.txt % 20 events, lag-predictors (ENSO(4 each), IOD(4),Monsoon(4), Temperature(4), curah hujan(13)), 1 output (rice_fertilizer freq)
factors=Za_Pangkep1(:,1:20);
ZaPangkep=Za_Pangkep1(:,21);
tahun=Za_Pangkep1(:,22);
mdl = stepwiselm(factors,ZaPangkep,'PEnter',0.05)
%exitt
%output
% mdl =
%
%
% Linear regression model:
%     y ~ 1 + x3 + x11 + x12
%
% Estimated Coefficients:
%                    Estimate     SE      tStat      pValue
%                    ________   ______   _______   __________
%
%    (Intercept)        3776.7    1916.3    1.9708     0.066305
%    x3   IODJJA       -1704.7    512.67   -3.3252    0.0042852
%    x11  CHJJA         321.73    143.15    2.2475     0.039065
%    x12  CHSON        -412.58    95.156   -4.3359   0.00051102
%
%
% Number of observations: 20, Error degrees of freedom: 16
% Root Mean Squared Error: 593
% R-squared: 0.667,  Adjusted R-Squared 0.604
% F-statistic vs. constant model: 10.7, p-value = 0.000425

tetapan=3776.7;k_IODJJA=-1704.7;k_CHJJA=321.73;k_CHSON=-412.58

IODJJA=factors(:,3);IODJJAz=IODJJA-mean(IODJJA)./std(IODJJA);
CHJJA=factors(:,11);CHJJAz=CHJJA-mean(CHJJA)./std(CHJJA);
CHSON=factors(:,12);CHSONz=CHSON-mean(CHSON)./std(CHSON);

% standardized variabels
 Y=ZaPangkep;X=[IODJJAz CHJJAz CHSONz];
 [B,BINT] = regress(Y,X)
 %exitt
```

```
%standardized coeffs B, strength:
%A standardized beta coefficient compares the strength of the effect of each individual independent
%variable to the dependent variable. The higher the absolute value of the beta coefficient, the stronger the effect.
% B =
%
%    -2.0310 IODJJA     4
%     0.6743 CHJJA      2
%    -0.4642 CHSON      3


%ZaPangkep_obs=ZaPangkep;

%ZaPangkep_mod=round(tetapan+k_IODJJA.*IODJJA+k_CHJJA.*CHJJA+k_CHSON.*CHSON);
%[m,n]=size(ZaPangkep_mod);

figure(1);
% plot(tahun,ZaPangkep_obs,'-ob',tahun,ZaPangkep_mod,'-r');
plot(tahun,ZaPangkep_obs,'-ob',tahun,ZaPangkep_mod,'-r');
%plot(tahun,yo,'-o',tahun,y3,'-r')
title('Grafik Model Prediksi Penggunaan Pupuk Za di Pangkep 2001-2020');
legend('Data Observasi','Data Prediksi')
% grid on
%legend('Data Observasi','Data Prediksi 3')
xlabel('Tahun');
ylabel('Pupuk Za');

satu=ones(size(ZaPangkep_obs));

[m,n]=size(ZaPangkep_obs);
time=1:m;

t=1:m;

%exitt
t=1:m;
data=ZaPangkep_obs;
tetha=45;
R=[cosd(tetha) sind(tetha);-sind(tetha) cosd(tetha)];

p1s=ZaPangkep_mod;
dp1s=[ZaPangkep_obs(t) p1s(t)];
nip1s=(R*dp1s');
jp1s=nip1s(:,2);
```

```
jrk_p1s=norm(jp1s);
sjp1s=std(jp1s);
RMSE_pre1 = sqrt(mean((p1s(t)-ZaPangkep_obs(t)).^2));
korr_pre1=xcorr(p1s(t),ZaPangkep_obs(t),'coeff');
k_pre1=korr_pre1(m);
%exitt

 axis('square')
 xa=min(ZaPangkep_obs):max(ZaPangkep_obs);
 ya=min(ZaPangkep_obs):max(ZaPangkep_obs);
% axis('square')
% xa=-1:6;
% ya=-1:6;
figure(2);
plot(data,ZaPangkep_mod,'o'),hold on
plot(xa,ya,'r:','LineWidth',2),hold on
xlabel('Data Observasi')
ylabel('Data Prediksi')
title('Grafik Model Prediksi Penggunaan Pupuk Za di Pangkep 2001-2020');
text(700,3200,'r=0.667')
text(700,3000,'RMSE = 593')
% axis([0 17000 0 17000])
axis([min(ZaPangkep_obs) max(ZaPangkep_obs) min(ZaPangkep_obs) max(ZaPangkep_obs)])
%print -dtiff korelasi1.tif
```

h. Pupuk Padi SP-36 Pangkep

```
%Stepwise model for rice_fertilizer
%halmar halide,hydrometeorology lab geophysics dept. fmipa unhas, makassar 18/10/2021 data skripsi heral
clear
clf
load SP36_Pangkep.txt %  20 events, lag-predictors (ENSO(4 each), IOD(4),Monsoon(4), Temperature(4), curah hujan(13)), 1 output (rice_fertilizer freq)
factors=SP36_Pangkep(:,1:20);
sp36pangkep=SP36_Pangkep(:,21);
tahun=SP36_Pangkep(:,22);
mdl = stepwiselm(factors,sp36pangkep,'PEnter',0.05)
%exitt
%output
% mdl =
%
%
% Linear regression model:
%     y ~ 1 + x8 + x11
```

```
%
% Estimated Coefficients:
%                  Estimate      SE       tStat       pValue
%                  ________    _______    ________    __________
%
%    (Intercept)      -3900     2666.8    -1.4624       0.16187
%     x8    TEMPSON    -242.93     53.212    -4.5653    0.00027464
%     x11   CHJJA       427.55     142.19     3.0069     0.0079376
%
%
% Number of observations: 20, Error degrees of freedom: 17
% Root Mean Squared Error: 632
% R-squared: 0.588,  Adjusted R-Squared 0.539
% F-statistic vs. constant model: 12.1, p-value = 0.000538

tetapan=-3900;k_TEMPSON=-242.93;k_CHJJA=427.55

TEMPSON=factors(:,8);TEMPSONz=TEMPSON-
mean(TEMPSON)./std(TEMPSON);
CHJJA=factors(:,11);CHJJAz=CHJJA-mean(CHJJA)./std(CHJJA);

% standardized variabels
 Y=sp36pangkep;X=[TEMPSONz CHJJAz];
 [B,BINT] = regress(Y,X)
 %exitt
%standardized coeffs B, strength:
%A standardized beta coefficient compares the strength of the effect of each
individual independent
%variable to the dependent variable. The higher the absolute value of the beta
coefficient, the stronger the effect.
% B =
%
%    -255.7859 TEMPSON    2
%     482.1904 CHJJA      1

sp36pangkep_obs=sp36pangkep;
sp36pangkep_mod=round(tetapan+k_TEMPSON.*TEMPSON+k_CHJJA.*CHJJ
A);
[m,n]=size(sp36pangkep_mod);

% Exitt
% load obsmod.txt
% sp36pangkep_obs=obsmod(:,1);
% sp36pangkep_mod=obsmod(:,2);

figure(1);
```

```
% plot(tahun,sp36pangkep_obs,'-ob',tahun,sp36pangkep_mod,'-r');
plot(tahun,sp36pangkep_obs,'-ob',tahun,sp36pangkep_mod,'-r');
%plot(tahun,yo,'-o',tahun,y3,'-r')
title('Grafik Model Prediksi Penggunaan Pupuk SP-36 di Pangkep 2001-2020');
legend('Data Observasi','Data Prediksi')
% grid on
%legend('Data Observasi','Data Prediksi 3')
xlabel('Tahun');
ylabel('Pupuk SP-36');

satu=ones(size(sp36pangkep_obs));

[m,n]=size(sp36pangkep_obs);
time=1:m;

t=1:m;

%exitt
t=1:m;

data=sp36pangkep_obs;
tetha=45;
R=[cosd(tetha) sind(tetha);-sind(tetha) cosd(tetha)];

p1s=sp36pangkep_mod;
dp1s=[sp36pangkep_obs(t) p1s(t)];
nip1s=(R*dp1s');
jp1s=nip1s(:,2);
jrk_p1s=norm(jp1s);
sjp1s=std(jp1s);
RMSE_pre1 = sqrt(mean((p1s(t)-sp36pangkep_obs(t)).^2));
korr_pre1=xcorr(p1s(t),sp36pangkep_obs(t),'coeff');
k_pre1=korr_pre1(m);
%exitt

 axis('square')
 xa=min(sp36pangkep_obs):max(sp36pangkep_obs);
 ya=min(sp36pangkep_obs):max(sp36pangkep_obs);
% axis('square')
% xa=-1:6;
% ya=-1:6;

figure(2);
plot(data,sp36pangkep_mod,'o'),hold on
plot(xa,ya,'r:','LineWidth',2),hold on
xlabel('Data Observasi')
```

```
ylabel('Data Prediksi')
title('Grafik Model Prediksi Penggunaan Pupuk SP-36 di Pangkep 2001-2020');
text(700,3200,'r=0.588')
text(700,3000,'RMSE = 632')
% axis([0 17000 0 17000])
axis([min(sp36pangkep_obs) max(sp36pangkep_obs) min(sp36pangkep_obs) max(sp36pangkep_obs)])
%print -dtiff korelasi1.tif
```

i. Pupuk Padi NPK Pangkep

```
%Stepwise model for rice_fertilizer
%halmar halide,hydrometeorology lab geophysics dept. fmipa unhas, makassar 18/10/2021 data skripsi heral
clear
clf
load NPK_Pangkep.txt % 20 events, lag-predictors (ENSO(4 each), IOD(4),Monsoon(4), Temperature(4), curah hujan(13)), 1 output (rice_fertilizer freq)
factors=NPK_Pangkep(:,1:20);
npkpangkep=NPK_Pangkep(:,21);
tahun=NPK_Pangkep(:,22);
mdl = stepwiselm(factors,npkpangkep,'PEnter',0.05)
%exitt
%output
% mdl =
%
%
% Linear regression model:
%     y ~ 1 + x8
%
% Estimated Coefficients:
%                    Estimate     SE      tStat      pValue
%                    ________   ______   _______   __________
%
%     (Intercept)        5776.9    592.2     9.755    1.3065e-08
%     x8    TEMPSON     -192.54    27.136   -7.0952    1.2955e-06
%
%
% Number of observations: 20, Error degrees of freedom: 18
% Root Mean Squared Error: 637
% R-squared: 0.737,  Adjusted R-Squared 0.722
% F-statistic vs. constant model: 50.3, p-value = 1.3e-06

tetapan=5776.9;k_TEMPSON=-192.54
```

```
TEMPSON=factors(:,8);TEMPSONz=TEMPSON-
mean(TEMPSON)./std(TEMPSON);

% standardized variabels
 Y=npkpangkep;X=[TEMPSONz];
 [B,BINT] = regress(Y,X)
 %exitt
%standardized coeffs B, strength:
%A standardized beta coefficient compares the strength of the effect of each individual independent
%variable to the dependent variable. The higher the absolute value of the beta coefficient, the stronger the effect.
% B =
%
%    73.8192 TEMPSON      1

 npkpangkep_obs=npkpangkep;
 npkpangkep_mod=round(tetapan+k_TEMPSON.*TEMPSON);
[m,n]=size(npkpangkep_mod);

% Exitt
% load obsmod.txt
% npkpangkep_obs=obsmod(:,1);
% npkpangkep_mod=obsmod(:,2);

figure(1);
% plot(tahun,npkpangkep_obs,'-ob',tahun,npkpangkep_mod,'-r');
plot(tahun,npkpangkep_obs,'-ob',tahun,npkpangkep_mod,'-r');
%plot(tahun,yo,'-o',tahun,y3,'-r')
title('Grafik Model Prediksi Penggunaan Pupuk NPK di Pangkep 2001-2020');
legend('Data Observasi','Data Prediksi')
% grid on
%legend('Data Observasi','Data Prediksi 3')
xlabel('Tahun');
ylabel('Pupuk NPK');

satu=ones(size(npkpangkep_obs));

[m,n]=size(npkpangkep_obs);
time=1:m;

t=1:m;

%exitt
t=1:m;
```

```
data=npkpangkep_obs;
tetha=45;
R=[cosd(tetha) sind(tetha);-sind(tetha) cosd(tetha)];

p1s=npkpangkep_mod;
dp1s=[npkpangkep_obs(t) p1s(t)];
nip1s=(R*dp1s');
jp1s=nip1s(:,2);
jrk_p1s=norm(jp1s);
sjp1s=std(jp1s);
RMSE_pre1 = sqrt(mean((p1s(t)-npkpangkep_obs(t)).^2));
korr_pre1=xcorr(p1s(t),npkpangkep_obs(t),'coeff');
k_pre1=korr_pre1(m);
%exitt

 axis('square')
 xa=min(npkpangkep_obs):max(npkpangkep_obs);
 ya=min(npkpangkep_obs):max(npkpangkep_obs);
% axis('square')
% xa=-1:6;
% ya=-1:6;

figure(2);
plot(data,npkpangkep_mod,'o'),hold on
plot(xa,ya,'r:','LineWidth',2),hold on
xlabel('Data Observasi')
ylabel('Data Prediksi')
title('Grafik Model Prediksi Penggunaan Pupuk NPK di Pangkep 2001-2020');
text(200,3700,'r=0.737')
text(200,3500,'RMSE = 637')
% axis([0 17000 0 17000])
axis([min(npkpangkep_obs) max(npkpangkep_obs) min(npkpangkep_obs) max(npkpangkep_obs)])
%print -dtiff korelasi1.tif
```

j. Pupuk Padi Organik Pangkep

```
%Stepwise model for rice_fertilizer
%halmar halide,hydrometeorology lab geophysics dept. fmipa unhas, makassar 18/10/2021 data skripsi heral
clear
clf
load Organik_Pangkep.txt %   20 events, lag-predictors (ENSO(4 each), IOD(4),Monsoon(4), Temperature(4), curah hujan(13)), 1 output (rice_fertilizer freq)
factors=Organik_Pangkep(:,1:20);
organikpangkep=Organik_Pangkep(:,21);
```

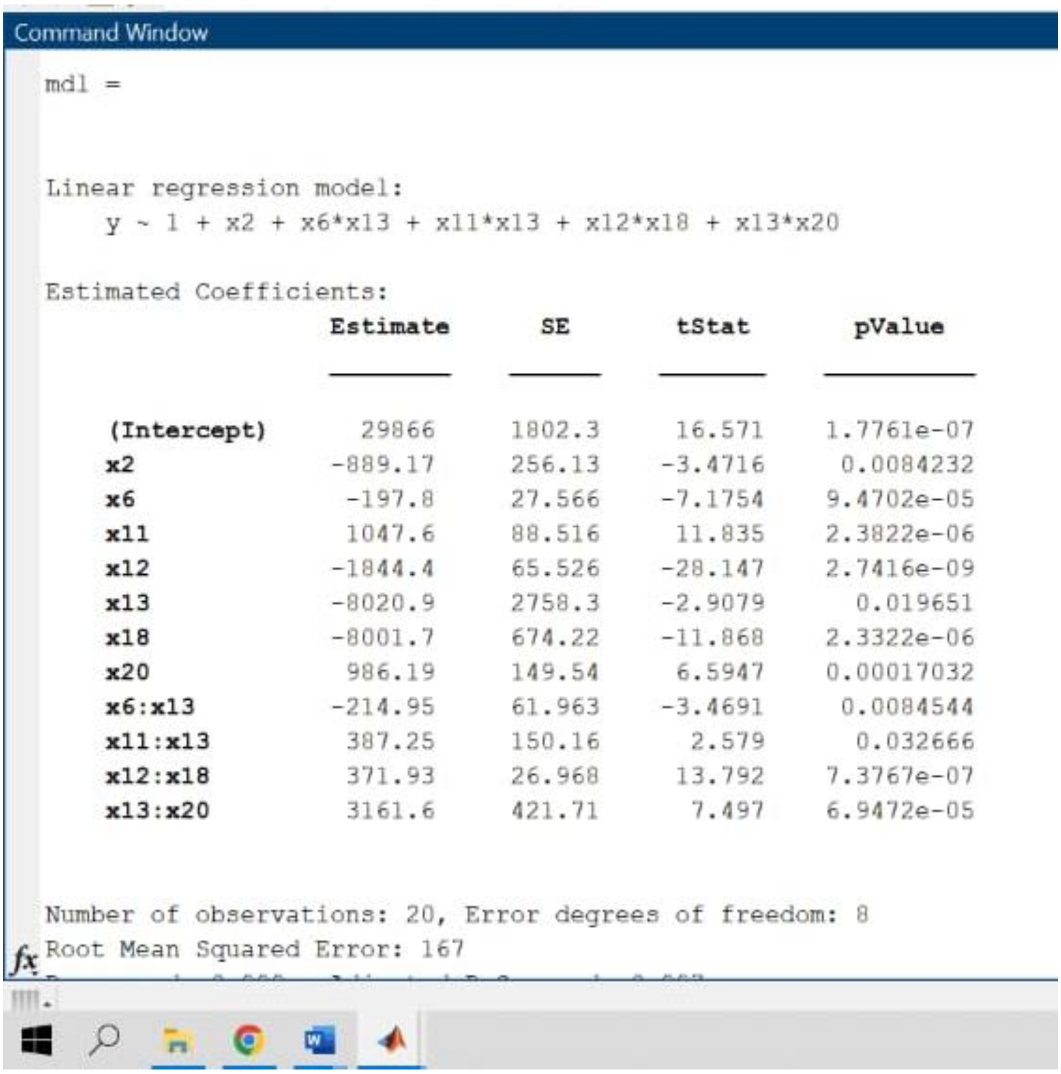
```
tahun=Organik_Pangkep(:,22);
mdl = stepwiselm(factors,organikpangkep,'PEnter',0.05)
%exitt
%output
% mdl =
%
%
% Linear regression model:
%     y ~ 1 + x6 + x12
%
% Estimated Coefficients:
%                      Estimate      SE       tStat       pValue
%                      ________    ______    _______    __________
%
%     (Intercept)           10128     1777.6     5.6974    2.6187e-05
%     x6     TEMPMAM        177.2     64.733     2.7374      0.014033
%     x12    CHSON         -534.43     114.4    -4.6717    0.00021895
%
%
% Number of observations: 20, Error degrees of freedom: 17
% Root Mean Squared Error: 844
% R-squared: 0.611,  Adjusted R-Squared: 0.565
% F-statistic vs. constant model: 13.4, p-value = 0.000326

tetapan=10128;k_TEMPMAM=177.2;k_CHSON=-534.43

TEMPMAM=factors(:,6);TEMPMAMz=TEMPMAM-
mean(TEMPMAM)./std(TEMPMAM);
CHSON=factors(:,12);CHSONz=CHSON-mean(CHSON)./std(CHSON);

% standardized variabels
 Y=organikpangkep;X=[TEMPMAMz CHSONz];
 [B,BINT] = regress(Y,X)
 %exitt
%standardized coeffs B, strength:
%A standardized beta coefficient compares the strength of the effect of each
individual independent
%variable to the dependent variable. The higher the absolute value of the beta
coefficient, the stronger the effect.
% B =
%
%    17.9586 ENSOMAM    2
%    30.4946 CHSON      1

organikpangkep_obs=organikpangkep;
```

```
organikpangkep_mod=round(tetapan+k_TEMPMAM.*TEMPMAM+k_CHSON.
*CHSON);
[m,n]=size(organikpangkep_mod);

figure(1);
% plot(tahun,organikpangkep_obs,'-ob',tahun,organikpangkep_mod,'-r');
plot(tahun,organikpangkep_obs,'-ob',tahun,organikpangkep_mod,'-r');
%plot(tahun,yo,'-o',tahun,y3,'-r')
title('Grafik Model Prediksi Penggunaan Pupuk Organik di Pangkep 2001-2020');
legend('Data Observasi','Data Prediksi')
% grid on
%legend('Data Observasi','Data Prediksi 3')
xlabel('Tahun');
ylabel('Pupuk Organik');

satu=ones(size(organikpangkep_obs));

[m,n]=size(organikpangkep_obs);
time=1:m;

t=1:m;

%exitt
t=1:m;

data=organikpangkep_obs;
tetha=45;
R=[cosd(tetha) sind(tetha);-sind(tetha) cosd(tetha)];

p1s=organikpangkep_mod;
dp1s=[organikpangkep_obs(t) p1s(t)];
nip1s=(R*dp1s');
jp1s=nip1s(:,2);
jrk_p1s=norm(jp1s);
sjp1s=std(jp1s);
RMSE_pre1 = sqrt(mean((p1s(t)-organikpangkep_obs(t)).^2));
korr_pre1=xcorr(p1s(t),organikpangkep_obs(t),'coeff');
k_pre1=korr_pre1(m);
%exitt

 axis('square')
 xa=min(organikpangkep_obs):max(organikpangkep_obs);
 ya=min(organikpangkep_obs):max(organikpangkep_obs);
% axis('square')
% xa=-1:6;
% ya=-1:6;
```

```
figure(2);
plot(data,organikpangkep_mod,'o'),hold on
plot(xa,ya,'r:','LineWidth',2),hold on
xlabel('Data Observasi')
ylabel('Data Prediksi')
title('Grafik Model Prediksi Penggunaan Pupuk Organik di Pangkep 2001-2020');
text(200,3700,'r=0.611')
text(200,3500,'RMSE = 844')
% axis([0 17000 0 17000])
axis([min(organikpangkep_obs) max(organikpangkep_obs)
min(organikpangkep_obs) max(organikpangkep_obs)])
%print -dtiff korelasi1.tif
```

Lampiran 3. Hasil regresi di Maros dan Pangkajene Kepulauan

a. Pupuk Urea di Maros



```
Command Window
mdl =

Linear regression model:
    y ~ 1 + x2 + x6*x13 + x11*x13 + x12*x18 + x13*x20

Estimated Coefficients:
                   Estimate     SE        tStat       pValue
                   ________   ______    _______    __________

    (Intercept)      29866    1802.3     16.571    1.7761e-07
    x2             -889.17    256.13    -3.4716     0.0084232
    x6              -197.8    27.566    -7.1754    9.4702e-05
    x11             1047.6    88.516     11.835    2.3822e-06
    x12            -1844.4    65.526    -28.147    2.7416e-09
    x13            -8020.9    2758.3    -2.9079      0.019651
    x18            -8001.7    674.22    -11.868    2.3322e-06
    x20             986.19    149.54     6.5947    0.00017032
    x6:x13         -214.95    61.963    -3.4691     0.0084544
    x11:x13         387.25    150.16      2.579      0.032666
    x12:x18         371.93    26.968     13.792    7.3767e-07
    x13:x20         3161.6    421.71      7.497    6.9472e-05

Number of observations: 20, Error degrees of freedom: 8
Root Mean Squared Error: 167
```

b. Pupuk Za di Maros

```
Command Window
>> ZaMaros
1. Adding x8, FStat = 20.238, pValue = 0.000277816

mdl =


Linear regression model:
    y ~ 1 + x8

Estimated Coefficients:
                   Estimate      SE       tStat       pValue
                   ________    ______    _______    __________

    (Intercept)     3955.7     546.15     7.2429    9.7986e-07
    x8             -112.58     25.026    -4.4987    0.00027782


Number of observations: 20, Error degrees of freedom: 18
Root Mean Squared Error: 587
R-squared: 0.529,  Adjusted R-Squared: 0.503
F-statistic vs. constant model: 20.2, p-value = 0.000278

k_TEMPSON =

 -112.5800
fx
```

c. Pupuk SP-36 di Maros

```
Command Window
>> SP36Maros
1. Adding x6, FStat = 27.4668, pValue = 5.52857e-05
2. Adding x7, FStat = 7.1956, pValue = 0.01574

mdl =


Linear regression model:
    y ~ 1 + x6 + x7

Estimated Coefficients:
                   Estimate      SE       tStat       pValue
                   ________    ______    _______    _________

    (Intercept)    -2472.3     2335.4    -1.0586      0.30457
    x6             -123.93     18.661    -6.6409    4.169e-06
    x7              248.42     92.607     2.6825      0.01574


Number of observations: 20, Error degrees of freedom: 17
Root Mean Squared Error: 409
R-squared: 0.722,  Adjusted R-Squared: 0.689
F-statistic vs. constant model: 22.1, p-value = 1.89e-05

k_TEMPJJA =

fx
```

d. Pupuk NPK di Maros

```
Command Window
>> NPKMaros
1. Adding x5, FStat = 44.1348, pValue = 3.10104e-06

mdl =


Linear regression model:
    y ~ 1 + x5

Estimated Coefficients:
                   Estimate      SE       tStat       pValue
                   ________    ______    _______    __________

    (Intercept)     2878.5     248.54     11.582    8.9171e-10
    x5             -95.203     14.331    -6.6434     3.101e-06


Number of observations: 20, Error degrees of freedom: 18
Root Mean Squared Error: 597
R-squared: 0.71,  Adjusted R-Squared: 0.694
F-statistic vs. constant model: 44.1, p-value = 3.1e-06

k_TEMPDJF =

  -95.2030

fx
```

e. Pupuk Organik di Maros

```
Command Window
>> organikm
1. Adding x11, FStat = 12.4858, pValue = 0.00237326

mdl =


Linear regression model:
    y ~ 1 + x11

Estimated Coefficients:
                   Estimate      SE       tStat       pValue
                   ________    ______    _______    _________

    (Intercept)     3924.8     1022.1     3.8399    0.0011999
    x11            -143.29     40.551    -3.5335    0.0023733


Number of observations: 20, Error degrees of freedom: 18
Root Mean Squared Error: 356
R-squared: 0.41,  Adjusted R-Squared: 0.377
F-statistic vs. constant model: 12.5, p-value = 0.00237

k_CHJJA =

 -143.2900

fx
```

f. Pupuk Urea di Pangkep

```
Command Window
>> ureap
1. Adding x8, FStat = 63.3332, pValue = 2.64028e-07

mdl =


Linear regression model:
    y ~ 1 + x8

Estimated Coefficients:
                   Estimate      SE       tStat       pValue
                   ________    ______    _______    __________

    (Intercept)      15859     1214.3      13.06    1.2764e-10
    x8             -442.82     55.643    -7.9582    2.6403e-07


Number of observations: 20, Error degrees of freedom: 18
Root Mean Squared Error: 1.31e+03
R-squared: 0.779,  Adjusted R-Squared: 0.766
F-statistic vs. constant model: 63.3, p-value = 2.64e-07

k_TEMPSON =

 -442.8200

fx
```

g. Pupuk Za di Pangkep

```
Command Window
>> za
1. Adding x12, FStat = 12.1852, pValue = 0.00260986
2. Adding x3, FStat = 6.1283, pValue = 0.024124
3. Adding x11, FStat = 5.0512, pValue = 0.039065

mdl =


Linear regression model:
    y ~ 1 + x3 + x11 + x12

Estimated Coefficients:
                   Estimate      SE       tStat       pValue
                   ________    ______    _______    __________

    (Intercept)     3776.7     1916.3     1.9708      0.066305
    x3             -1704.7     512.67    -3.3252     0.0042852
    x11             321.73     143.15     2.2475      0.039065
    x12            -412.58     95.156    -4.3359    0.00051102


Number of observations: 20, Error degrees of freedom: 16
Root Mean Squared Error: 593
R-squared: 0.667,  Adjusted R-Squared: 0.604
F-statistic vs. constant model: 10.7, p-value = 0.000425

fx k_CHSON =
```

h. Pupuk SP-36 di Pangkep

```
Command Window
>> sp36pangkepfix
1. Adding x8, FStat = 10.4863, pValue = 0.00456192
2. Adding x11, FStat = 9.0413, pValue = 0.0079376

mdl =


Linear regression model:
    y ~ 1 + x8 + x11

Estimated Coefficients:
                   Estimate      SE        tStat       pValue
                   ________    ______    _______    __________

    (Intercept)      -3900     2666.8    -1.4624       0.16187
    x8             -242.93     53.212    -4.5653    0.00027464
    x11             427.55     142.19     3.0069     0.0079376


Number of observations: 20, Error degrees of freedom: 17
Root Mean Squared Error: 632
R-squared: 0.588,  Adjusted R-Squared: 0.539
F-statistic vs. constant model: 12.1, p-value = 0.000538

k_CHJJA =
```

i. Pupuk NPK di Pangkep

```
Command Window
>> npkp
1. Adding x8, FStat = 50.342, pValue = 1.29551e-06

mdl =


Linear regression model:
    y ~ 1 + x8

Estimated Coefficients:
                   Estimate      SE       tStat        pValue
                   ________    ______    _______    __________

    (Intercept)     5776.9      592.2      9.755    1.3065e-08
    x8             -192.54     27.136    -7.0952    1.2955e-06


Number of observations: 20, Error degrees of freedom: 18
Root Mean Squared Error: 637
R-squared: 0.737,  Adjusted R-Squared: 0.722
F-statistic vs. constant model: 50.3, p-value = 1.3e-06

k_TEMPSON =

 -192.5400
```

j. Pupuk Organik di Pangkep

```
Command Window
>> organikp
1. Adding x12, FStat = 14.1283, pValue = 0.00143762
2. Adding x6, FStat = 7.4935, pValue = 0.014033

mdl =


Linear regression model:
    y ~ 1 + x6 + x12

Estimated Coefficients:
                   Estimate      SE      tStat       pValue
                   ________    ______    _______    __________

    (Intercept)      10128     1777.6     5.6974    2.6187e-05
    x6               177.2     64.733     2.7374      0.014033
    x12            -534.43      114.4    -4.6717    0.00021895


Number of observations: 20, Error degrees of freedom: 17
Root Mean Squared Error: 844
R-squared: 0.611,  Adjusted R-Squared: 0.565
F-statistic vs. constant model: 13.4, p-value = 0.000326

k_CHSON =

fx  -534.4300
```

Lampiran 4. Data Parameter Atmosfer

a. Data ENSO

ENSO_DJF	ENSO_MAM	ENSO_JJA	ENSO_SON
-0,607082	-0,22738733	0,0542486	-0,1735547
0,4695736	0,27645933	0,7626183	1,23634333
0,6897813	0,09833553	0,1122182	0,44008933
0,425972	0,14758557	0,5184187	0,776946
0,063232	0,413935	0,1732781	-0,1168433
-0,149053	-0,25400403	0,277079	0,89607433
-0,252993	-0,10882093	-0,255772	-1,2413037
-1,413602	-0,76918533	-0,052815	-0,198861
0,0799273	-0,13842067	0,716278	1,154626
0,3711233	0,61703179	-0,831951	-1,4864133
-1,286353	-0,62299433	-0,260392	-0,8171997
-0,507255	-0,18448793	0,5373413	0,44150967

-0,258818	-0,0342513	-0,191068	-0,0111138
0,0162087	0,34792223	0,3652583	0,69103267
1,292431	0,92878733	1,6899133	2,38634
1,4425717	1,16139833	-0,112245	-0,505518
-0,351175	0,2725161	0,1949416	-0,5395873
-0,166699	-0,2800714	0,258258	0,82095467
0,594602	0,82366867	0,5314847	0,57076267
0,0916787	0,36859227	-0,113966	-0,8511627
0,0272036	0,14183044	0,2186564	0,17365606

b. Data IOD

IOD_DJF	IOD_MAM	IOD_JJA	IOD_SON
-0,0946667	0,173	0,003	-0,176667
-0,061	-0,1393333	-0,112	0,3923333
0,06033333	-0,0156667	0,2333333	-0,025
0,08	-0,1043333	-0,164667	0,0416667
-0,256	-0,042	-0,194	-0,284333
-0,018	-0,0646667	0,1776667	0,6313333
0,121	0,24666667	0,2113333	0,2226667
0,068	0,12566667	0,303	0,125
0,19	0,24566667	0,0423333	0,0686667
0,10666667	0,351	0,0403333	-0,270333
0,17333333	0,22866667	0,315	0,4276667
0,15	-0,12	0,5073333	0,2843333
0,16	-0,155	-0,182667	0,0366667
0,02366667	-0,0153333	-0,146667	0,1313333
0,014	0,082	0,4706667	0,504
0,02	0,093	-0,440667	-0,267333
0,11333333	0,549	0,5383333	0,2423333
0,17966667	0,058	0,2176667	0,7256667

0,42	0,42566667	0,6533333	1,0266667
0,15733333	0,187	0,305	0,0973333
0,08038333	0,10545	0,1388833	0,1967

c. Data Monsun

MON_DJF	MON_MAM	MON_JJA	MON_SON
3,2693333	0,6719	2,336333	1,0956667
2,9263333	1,144	2,098667	0,955
2,409	1,73966667	2,122	0,5897
2,6526667	1,64333333	2,267667	1,394
2,619	2,28266667	2,224	1,1806667
2,3323333	2,21333333	2,288	0,4280867
2,7573333	1,0284	2,200333	0,7954
2,8273333	0,9333	2,145333	0,4859
2,8103333	0,61766667	1,665	1,1386667
2,8883333	1,51003333	1,739333	0,3695667
2,4303333	2,27833333	1,795	0,9447667
2,7473333	2,063	1,882333	0,4858
2,6133333	0,85043333	2,079333	0,4431333
2,512	1,60466667	1,760667	0,8236667
2,0956667	1,545	1,666	0,3163833
2,9453333	1,718	1,859333	0,7527333
2,9976667	1,66566667	2,284333	0,3663667
2,8773333	1,34533333	1,932667	0,8217333
3,1073333	0,85403333	1,675	0,3605163
2,2813333	1,828	1,561	0,8579667
2,7049833	1,47683833	1,979117	0,730286

d. Data Curah Hujan

CH_DJF	CH_MAM	CH_JJA	CH_SON
82,47955	27,36767	27,58427	28,10005

82,94343	26,63223	27,44581	28,08704
77,79387	27,02596	27,26879	27,73086
80,65365	27,09003	27,36876	28,04031
81,07855	27,40843	27,86472	28,4741
54,63981	27,08722	27,22166	28,21171
26,9586	27,23548	27,49947	27,71953
65,18195	26,6668	26,82867	20,62832
53,45207	12,26247	23,64839	21,48602
55,55071	11,07778	22,95269	20,29558
62,36442	13,3821	23,20526	22,0675
68,93899	12,7308	23,40048	21,88459
63,15676	10,80703	23,17192	22,13405
62,37381	14,05824	23,16081	21,43728
65,35885	12,31889	24,48996	21,67407
57,52503	12,10974	22,35544	21,81111
49,41544	13,16551	24,57085	22,21613
56,69229	12,18124	25,48507	24,03728
78,30387	13,6403	24,14552	22,59857
74,61474	12,87596	22,9129	21,50382
64,97382	18,35619	25,12907	24,0069

e. Data Temperatur

Temp_DJF	Temp_MAM	Temp_JJA	Temp_SON
26,5965438	27,73979167	27,4570968	27,9397133
26,4483487	27,06666667	27,3809319	28,5104301
26,4351382	27,34681004	27,1298925	27,9441935
26,6643678	27,55508961	27,0740502	28,4724731
27,0133257	27,67566308	27,8817921	28,4993548

27,0301459	27,32756272	27,2053047	28,6232975
26,8487711	27,51089606	27,4012186	27,7592473
19,50901	26,96698925	26,4941577	16,0462366
5,20660522	17,21397849	25,6594982	16,6301075
4,61021505	15,28064516	25,5903226	15,6501792
7,80145929	17,70179211	24,8100358	18,0892473
5,810901	17,14014337	26,0741935	17,7290323
7,12596006	14,83189964	26,3964158	17,5111111
7,77265745	17,70716846	24,7637993	18,3634409
8,15898618	16,11505376	27,6989247	16,9584229
8,09936967	15,34480287	25,2189964	17,309319
6,76152074	17,16415771	27,9247312	17,118638
7,7016129	17,08637993	28,0655914	19,4759857
9,03033794	15,87096774	27,9448029	17,9985663
8,03114572	16,39569892	25,3222222	17,0383513
14,6328211	20,85210786	26,6746989	21,1833674