Prediksi Penjualan Kedelai

In [2]:
```
import itertools
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import statsmodels.api as sm
import warnings
warnings.filterwarnings('ignore')
import matplotlib

plt.style.use('fivethirtyeight')
matplotlib.rcParams['axes.labelsize'] = 14
matplotlib.rcParams['xtick.labelsize'] = 12
matplotlib.rcParams['ytick.labelsize'] = 12
matplotlib.rcParams['text.color'] = 'k'

def formatuang(x,pos):
    frek = 0
    while abs(x) >= 1000:
        frek += 1
        x /= 1000
    return '%.2f%s' % (x,['','Ribu','Juta','Mlyr','Trln','Qdln'][frek])

def formatberat(x,pos):
    if x<=100 :
        return '%2.2f%s' % (x,'')
    elif x>=1000:
        return '%2.2f%s' % (x/1000,'Ton')
    else:
        return '%1.2f%s' % (x/100,'Kwintal')
```

In [3]:
```
df=pd.read_csv('ReportPenjualan.tsv',sep='\t')
df.head()
```

Out[3]:

	Tanggal	Tujuan	Jenis	Harga jual	Jumlah	Driver	No. Polisi	Berat	Sisa	Keterangan
0	2022-12-28	NaN	Lotus	NaN	NaN	Tio	AG 9627 UB	8000	8	Datang
1	2023-01-02	MBAK ITA	Lotus	13000.0	26000000.0	Tio	AG 9627 UB	2000	6	Kirim
2	2023-01-02	MAS HERI	Lotus	13000.0	13000000.0	Tio	AG 9627 UB	1000	5	Kirim
3	2023-01-03	MAS RIZAL	Lotus	13000.0	650000.0	Tio	AG 9627 UB	50	4,95	Kirim
4	2023-01-03	MAS YOGA	Lotus	13000.0	1950000.0	Tio	AG 9627 UB	150	4,8	Kirim

In [4]:
```
df[df["Keterangan"]=="Datang"].head()
```

Out[4]:

	Tanggal	Tujuan	Jenis	Harga jual	Jumlah	Driver	No. Polisi	Berat	Sisa	Keterangan
0	2022-12-28	NaN	Lotus	NaN	NaN	Tio	AG 9627 UB	8000	8	Datang
23	2023-01-05	NaN	Hiu	NaN	NaN	Bayu	W 8962 DO	10000	10	Datang
34	2023-01-06	NaN	Hiu	NaN	NaN	Bayu	W 8962 DO	4000	4	Datang
45	2023-01-07	NaN	Lotus	NaN	NaN	Bayu	W 8962 DO	5000	5	Datang
59	2023-01-07	NaN	Hiu	NaN	NaN	Bayu	W 8962 DO	9000	8,9	Datang

In [5]:
```
df.dropna(subset=['Jumlah'],inplace=True)
df.head()
```

Out[5]:

	Tanggal	Tujuan	Jenis	Harga jual	Jumlah	Driver	No. Polisi	Berat	Sisa	Keteran
1	2023-01-02	MBAK ITA	Lotus	13000.0	26000000.0	Tio	AG 9627 UB	2000	6	K
2	2023-01-02	MAS HERI	Lotus	13000.0	13000000.0	Tio	AG 9627 UB	1000	5	K
3	2023-01-03	MAS RIZAL	Lotus	13000.0	650000.0	Tio	AG 9627 UB	50	4,95	K
4	2023-01-03	MAS YOGA	Lotus	13000.0	1950000.0	Tio	AG 9627 UB	150	4,8	K
5	2023-01-03	PAK SUNANDAR	Lotus	13000.0	1950000.0	Tio	AG 9627 UB	150	4,65	K

In [6]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 1559 entries, 1 to 1623
Data columns (total 10 columns):
 #   Column       Non-Null Count  Dtype  
---  ------       --------------  -----  
 0   Tanggal      1559 non-null   object 
 1   Tujuan       1558 non-null   object 
 2   Jenis        1559 non-null   object 
 3   Harga jual   1557 non-null   float64
 4   Jumlah       1559 non-null   float64
 5    Driver      1559 non-null   object 
 6    No. Polisi  1542 non-null   object 
 7   Berat        1559 non-null   int64  
 8   Sisa         1559 non-null   object 
 9   Keterangan   1559 non-null   object 
dtypes: float64(2), int64(1), object(7)
memory usage: 134.0+ KB
```

In [7]:
```
df[df['Harga jual'].isna()]
```

Out[7]:

	Tanggal	Tujuan	Jenis	Harga jual	Jumlah	Driver	No. Polisi	Berat	Sisa	Keterangan
1161	2023-04-02	MBAK ITA	Hiu	NaN	0.0	Bayu	W 8962 DO	500	2,7	Kirim
1175	2023-04-03	MAS AINUN	Lotus	NaN	0.0	P Kentung	B 9705 FYU	2000	7,45	Kirim

In [8]:
```
df['Harga jual']=df['Harga jual'].ffill(downcast='infer')
```

In [9]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 1559 entries, 1 to 1623
Data columns (total 10 columns):
 #   Column       Non-Null Count  Dtype 
---  ------       --------------  ----- 
 0   Tanggal      1559 non-null   object
 1   Tujuan       1558 non-null   object
 2   Jenis        1559 non-null   object
 3   Harga jual   1559 non-null   int64 
 4   Jumlah       1559 non-null   float64
 5    Driver      1559 non-null   object
 6    No. Polisi  1542 non-null   object
 7   Berat        1559 non-null   int64 
 8   Sisa         1559 non-null   object
 9   Keterangan   1559 non-null   object
dtypes: float64(1), int64(2), object(7)
memory usage: 134.0+ KB
```

In [10]:
```
df['Tujuan']=df['Tujuan'].fillna('TIDAK TAHU')
```

In [11]:
```
df[df['Jumlah']==0]
```

Out[11]:

	Tanggal	Tujuan	Jenis	Harga jual	Jumlah	Driver	No. Polisi	Berat	Sisa	Keterangan
1161	2023-04-02	MBAK ITA	Hiu	10700	0.0	Bayu	W 8962 DO	500	2,7	Kirim
1175	2023-04-03	MAS AINUN	Lotus	11000	0.0	P Kentung	B 9705 FYU	2000	7,45	Kirim

In [12]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 1559 entries, 1 to 1623
Data columns (total 10 columns):
 #   Column       Non-Null Count  Dtype 
---  ------       --------------  ----- 
 0   Tanggal      1559 non-null   object
 1   Tujuan       1559 non-null   object
 2   Jenis        1559 non-null   object
 3   Harga jual   1559 non-null   int64 
 4   Jumlah       1559 non-null   float64
 5    Driver      1559 non-null   object
 6    No. Polisi  1542 non-null   object
 7   Berat        1559 non-null   int64 
 8   Sisa         1559 non-null   object
 9   Keterangan   1559 non-null   object
dtypes: float64(1), int64(2), object(7)
memory usage: 134.0+ KB
```

In [13]:
```
for i in (df.iloc[:][df['Jumlah']==0].index):
    df['Jumlah'][i]=df['Harga jual'][i]*df['Berat'][i]
```

In [14]:
```
df[df['Jumlah']==0]
```

Out[14]:

	Tanggal	Tujuan	Jenis	Harga jual	Jumlah	Driver	No. Polisi	Berat	Sisa	Keterangan

Data Preprocessing

In [21]:
```
df_jual=df.copy()
df_jual.drop(df_jual.columns[[1,2,3,5,6,7,8,9]],axis=1,inplace=True)
df_jual.head()
```

Out[21]:

	Tanggal	Jumlah
1	2023-01-02	26000000.0
2	2023-01-02	13000000.0
3	2023-01-03	650000.0
4	2023-01-03	1950000.0
5	2023-01-03	1950000.0

In [22]:
```
df_jual['Tanggal'] = pd.to_datetime(df_jual['Tanggal'], format='%Y/%m/%d')
```

In [23]:
```
df_jual = df_jual.sort_values('Tanggal')

print(df_jual.head())

df_jual.isnull().sum()
df_jual.info()
```

```
    Tanggal      Jumlah
1 2023-01-02  26000000.0
2 2023-01-02  13000000.0
3 2023-01-03    650000.0
4 2023-01-03   1950000.0
5 2023-01-03   1950000.0
<class 'pandas.core.frame.DataFrame'>
Int64Index: 1559 entries, 1 to 1623
Data columns (total 2 columns):
 #   Column   Non-Null Count  Dtype
---  ------   --------------  -----
 0   Tanggal  1559 non-null   datetime64[ns]
 1   Jumlah   1559 non-null   float64
dtypes: datetime64[ns](1), float64(1)
memory usage: 36.5 KB
```

In [25]:
```
df_jual.groupby('Tanggal')['Jumlah'].sum().reset_index()

print(df_jual['Tanggal'].min())
print(df_jual['Tanggal'].max())
```

```
2023-01-02 00:00:00
2023-05-18 00:00:00
```

In [26]:
```
df_jual = df_jual.set_index('Tanggal')
df_jual.index
```

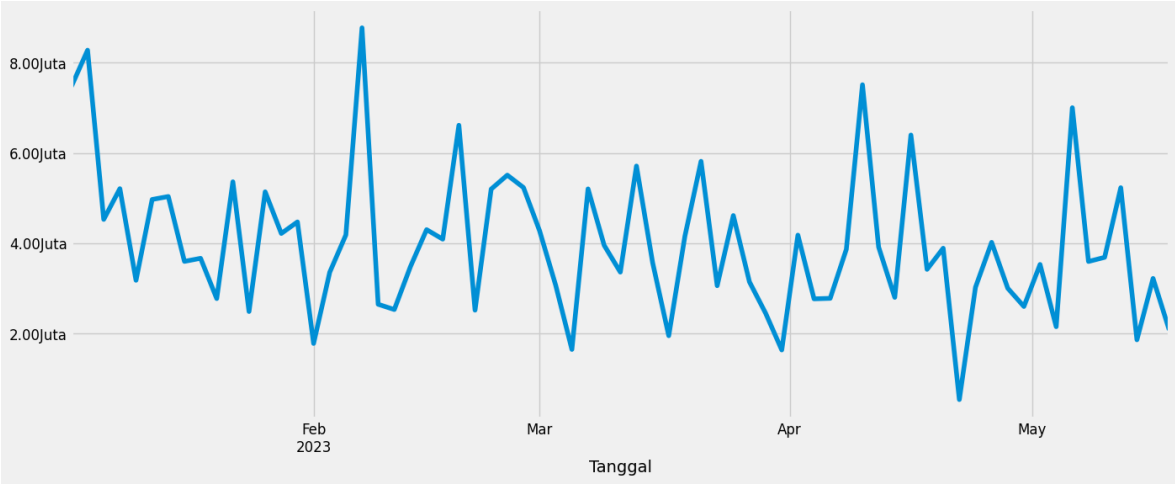
Out[26]:
```
DatetimeIndex(['2023-01-02', '2023-01-02', '2023-01-03', '2023-01-03',
               '2023-01-03', '2023-01-03', '2023-01-04', '2023-01-04',
               '2023-01-04', '2023-01-04',
               ...
               '2023-05-18', '2023-05-18', '2023-05-18', '2023-05-18',
               '2023-05-18', '2023-05-18', '2023-05-18', '2023-05-18',
               '2023-05-18', '2023-05-18'],
              dtype='datetime64[ns]', name='Tanggal', length=1559, freq=None)
```

In [27]:
```
y = df_jual['Jumlah'].resample('2D',label='left',closed='left').mean()
y
```

Out[27]:
```
Tanggal
2023-01-02    7.475000e+06
2023-01-04    8.276818e+06
2023-01-06    4.529444e+06
2023-01-08    5.210714e+06
2023-01-10    3.180962e+06
                  ...
2023-05-10    3.690000e+06
2023-05-12    5.232500e+06
2023-05-14    1.863750e+06
2023-05-16    3.223250e+06
2023-05-18    2.083421e+06
Freq: 2D, Name: Jumlah, Length: 69, dtype: float64
```

Data Visualization

In [28]:
```
from matplotlib.ticker import FuncFormatter
y.plot(figsize = (15, 6)).yaxis.set_major_formatter(FuncFormatter(formatuang))
plt.show()
```

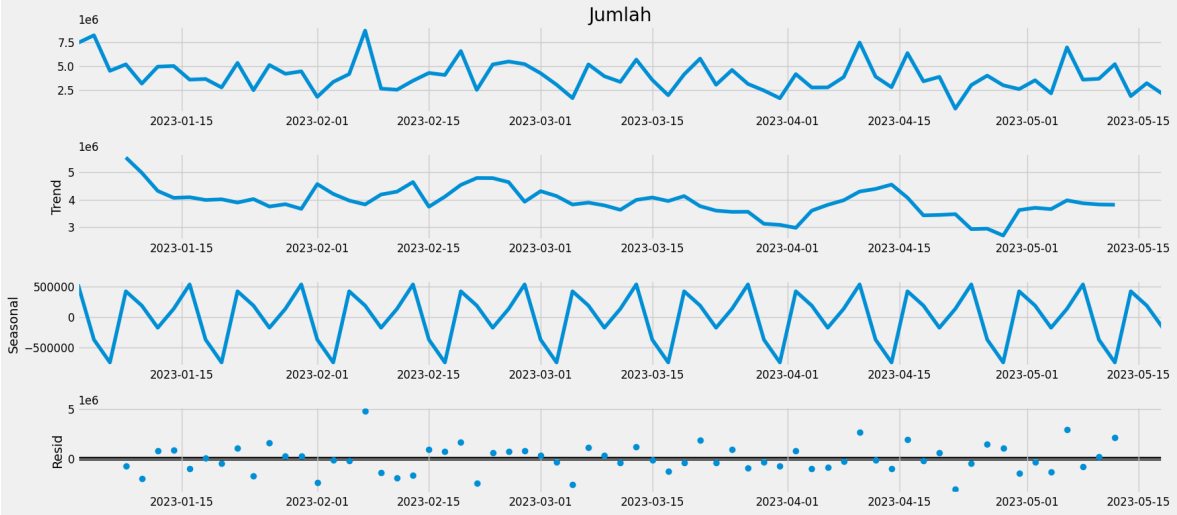


Dekomposisi Time-series

In [29]:
```
from pylab import rcParams
rcParams['figure.figsize'] = 18, 8

decomposition = sm.tsa.seasonal_decompose(y, model = 'additive')
```

```
fig = decomposition.plot()
plt.show()
```



Time series forecasting dengan ARIMA

ARIMA

- ARIMA yaitu *Autoregressive Integreted Moving Average*
- ARIMA biasa dinotasikan dengan *ARIMA(p, d, q)*
- Dimana
  - p merupakan orde untuk proses *autoreggresive*(AR)
  - d merupakan orde yang menyatakan banyaknya proses diferensi dilakukan pada data *time series* yang tidak stasioner
  - q merupakan orde yang menyatakan proses *moving average*(MA)

In [30]:
```
p = d = q = range(0, 3)

#Kombinasi yang mungkin untuk p, d dan q
pdq = list(itertools.product(p, d, q))
seasonal_pdq = [(x[0], x[1], x[2], 12) for x in list(itertools.product(p, d, q))]

print('Contoh kombinasi parameter ARIMA...')
print('SARIMAX: {} x {}'.format(pdq[1], seasonal_pdq[1]))
print('SARIMAX: {} x {}'.format(pdq[1], seasonal_pdq[2]))
print('SARIMAX: {} x {}'.format(pdq[2], seasonal_pdq[3]))
print('SARIMAX: {} x {}'.format(pdq[2], seasonal_pdq[4]))
```

```
Contoh kombinasi parameter ARIMA...
SARIMAX: (0, 0, 1) x (0, 0, 1, 12)
SARIMAX: (0, 0, 1) x (0, 0, 2, 12)
SARIMAX: (0, 0, 2) x (0, 1, 0, 12)
SARIMAX: (0, 0, 2) x (0, 1, 1, 12)
```

In [31]:
```
baris=[]
for param in pdq:
    for param_seasonal in seasonal_pdq:
        try:
            mod = sm.tsa.statespace.SARIMAX(y, order = param, seasonal_order = p
            result = mod.fit()
            baris.append(['ARIMA{}x{}'.format(param, param_seasonal),result.aic]
        except:
```

```
            continue
hasil = pd.DataFrame(baris,columns=['ARIMA','AIC'])
print(hasil.sort_values(['AIC']))
```

```
                           ARIMA          AIC
709  ARIMA(2, 2, 2)x(0, 2, 2, 12)  1436.312143
718  ARIMA(2, 2, 2)x(1, 2, 2, 12)  1437.550832
725  ARIMA(2, 2, 2)x(2, 2, 0, 12)  1438.126406
716  ARIMA(2, 2, 2)x(1, 2, 0, 12)  1438.744692
727  ARIMA(2, 2, 2)x(2, 2, 2, 12)  1439.382292
..                             ...          ...
358  ARIMA(1, 1, 1)x(0, 2, 1, 12)  4372.104542
600  ARIMA(2, 1, 1)x(0, 2, 1, 12)  4373.540546
573  ARIMA(2, 1, 0)x(0, 2, 1, 12)  4377.256411
331  ARIMA(1, 1, 0)x(0, 2, 1, 12)  4384.493531
169  ARIMA(0, 2, 0)x(0, 2, 1, 12)  4395.739255

[728 rows x 2 columns]
```

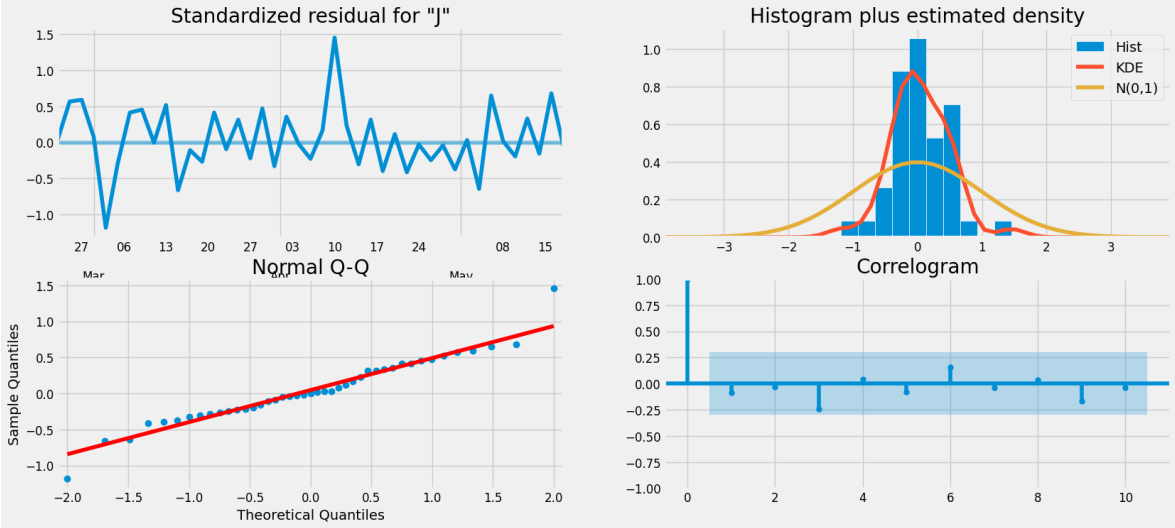
Mencari model ARIMA yang cocok

In [38]:
```
model = sm.tsa.statespace.SARIMAX(y, order = (2, 2, 2), seasonal_order = (0, 2,
result = model.fit()
print(result.summary())
```

```
                                     SARIMAX Results
==========================================================================================
Dep. Variable:                              Jumlah   No. Observations:
69
Model:             SARIMAX(2, 2, 2)x(0, 2, 2, 12)   Log Likelihood
-711.156
Date:                            Mon, 29 May 2023   AIC
1436.312
Time:                                    09:52:51   BIC
1448.641
Sample:                                01-02-2023   HQIC
1440.858
                                     - 05-18-2023
Covariance Type:                               opg
==============================================================================
                 coef    std err          z      P>|z|      [0.025      0.975]
------------------------------------------------------------------------------
ar.L1         -0.2354      1.069     -0.220      0.826      -2.330       1.859
ar.L2         -0.2709      1.027     -0.264      0.792      -2.285       1.743
ma.L1         -1.7514      0.516     -3.393      0.001      -2.763      -0.740
ma.L2          0.8062      0.526      1.533      0.125      -0.225       1.837
ma.S.L12      -1.1078      0.791     -1.400      0.161      -2.658       0.443
ma.S.L24       0.4268      0.770      0.554      0.580      -1.083       1.937
sigma2      2.931e+13   8.92e-15   3.28e+27      0.000    2.93e+13    2.93e+13
==========================================================================================
==
Ljung-Box (L1) (Q):                   0.36   Jarque-Bera (JB):                 4.
45
Prob(Q):                              0.55   Prob(JB):                         0.
11
Heteroskedasticity (H):               0.53   Skew:                             0.
26
Prob(H) (two-sided):                  0.24   Kurtosis:                         4.
49
==========================================================================================
==

Warnings:
[1] Covariance matrix calculated using the outer product of gradients (complex-st
ep).
[2] Covariance matrix is singular or near-singular, with condition number 3.19e+4
3. Standard errors may be unstable.
```

In [39]:
```
result.plot_diagnostics(figsize = (18, 8))
plt.show()
```



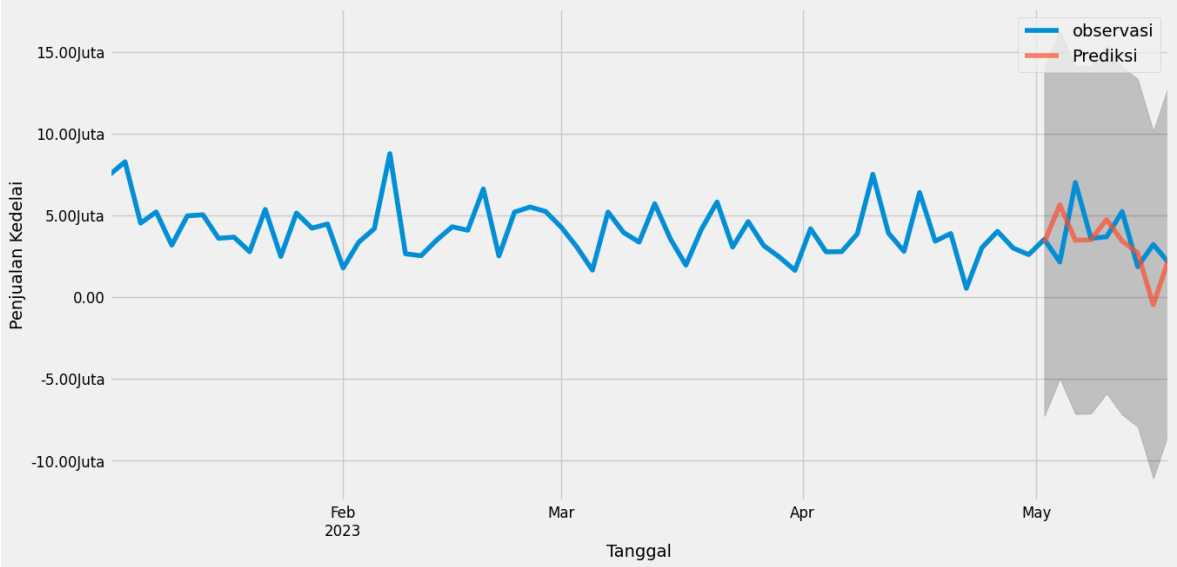
Validasi

In [40]:
```
prediction = result.get_prediction(start = pd.to_datetime('2023-05-02'), dynamic
prediction_ci = prediction.conf_int()
prediction_ci
```

Out[40]:

Tanggal	lower Jumlah	upper Jumlah
2023-05-02	-7.280461e+06	1.397843e+07
2023-05-04	-4.980318e+06	1.627857e+07
2023-05-06	-7.152653e+06	1.410622e+07
2023-05-08	-7.118369e+06	1.414050e+07
2023-05-10	-5.887450e+06	1.537139e+07
2023-05-12	-7.193661e+06	1.406512e+07
2023-05-14	-7.921608e+06	1.333716e+07
2023-05-16	-1.109621e+07	1.016256e+07
2023-05-18	-8.256712e+06	1.300167e+07

In [41]:
```
ax = y.plot(label = 'observasi')
prediction.predicted_mean.plot(ax = ax, label = 'Prediksi', alpha = 0.7, figsize
ax.fill_between(prediction_ci.index, prediction_ci.iloc[:, 0], prediction_ci.ilo
ax.yaxis.set_major_formatter(FuncFormatter(formatuang))
ax.set_xlabel("Tanggal")
ax.set_ylabel('Penjualan Kedelai')
plt.legend()
plt.show()
```



Analisa Eror

In [42]:
```
y_hat = prediction.predicted_mean
y_truth = y['2023-05-02':]

mse = ((y_hat - y_truth) ** 2).mean()
rmse = np.sqrt(mse)
print('MSE {}'.format(round(mse, 2)))
print('RMSE {}'.format(round(rmse, 2)))
```

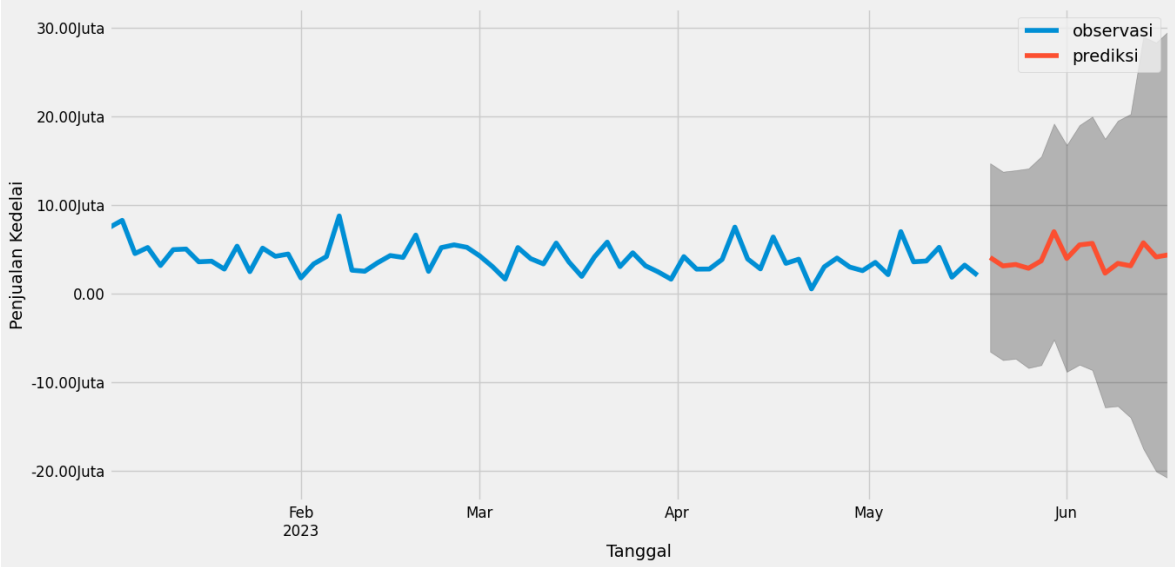
```
MSE 4826881849127.33
RMSE 2197016.58
```

Visualisasi

In [118…
```
pred_uc = result.get_forecast(steps = 15)
pred_ci = pred_uc.conf_int()

ax = y.plot(label = 'observasi', figsize = (14, 7))
pred_uc.predicted_mean.plot(ax = ax, label = 'prediksi')
ax.fill_between(pred_ci.index, pred_ci.iloc[:, 0], pred_ci.iloc[:, 1], color = '
ax.yaxis.set_major_formatter(FuncFormatter(formatuang))
ax.set_xlabel('Tanggal')
ax.set_ylabel('Penjualan Kedelai')

plt.legend()
plt.show()
```



Simpulan

Prediksi pendapatan harian untuk sebulan kedepan masih naik turun dengan puncak kenaikan pada akhir bulan dan puncak penurunan pada tengah bulan

Agregasi pembeli

In [49]:
```
df_beli=df.copy()
df_beli.drop(df_beli.columns[[0,2,3,5,6,8,9]],axis=1,inplace=True)
df_beli.head()
```

Out[49]:

	Tujuan	Jumlah	Berat
1	MBAK ITA	26000000.0	2000
2	MAS HERI	13000000.0	1000
3	MAS RIZAL	650000.0	50
4	MAS YOGA	1950000.0	150
5	PAK SUNANDAR	1950000.0	150

In [50]:
```
import re
import string
import unicodedata
from tqdm.notebook import tqdm
def preprocessing(text):
    text=text.upper()
    text=re.sub(r"\s+", " ", text, flags=re.UNICODE) # menghilangkan whitespace
    text=unicodedata.normalize("NFD", text).encode("ascii", "ignore").decode("as
    return " ".join(text.split())
df_beli["Tujuan"] = [preprocessing(x) for x in tqdm(df_beli["Tujuan"].values)]
df_beli.head()
```

```
0%|          | 0/1559 [00:00<?, ?it/s]
```

Out[50]:

	Tujuan	Jumlah	Berat
1	MBAK ITA	26000000.0	2000
2	MAS HERI	13000000.0	1000
3	MAS RIZAL	650000.0	50
4	MAS YOGA	1950000.0	150
5	PAK SUNANDAR	1950000.0	150

In [51]:
```
df_beli.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 1559 entries, 1 to 1623
Data columns (total 3 columns):
 #   Column  Non-Null Count  Dtype  
---  ------  --------------  -----  
 0   Tujuan  1559 non-null   object 
 1   Jumlah  1559 non-null   float64
 2   Berat   1559 non-null   int64  
dtypes: float64(1), int64(1), object(1)
memory usage: 81.0+ KB
```

In [52]:
```
df_beli1=df_beli.copy()
df_beli1.drop(df_beli1.columns[[2]],axis=1,inplace=True)
df_beli1=df_beli1.groupby(['Tujuan']).sum()
df_beli1=df_beli1.sort_values(by=['Jumlah'],ascending=False).reset_index()
df_beli1
```

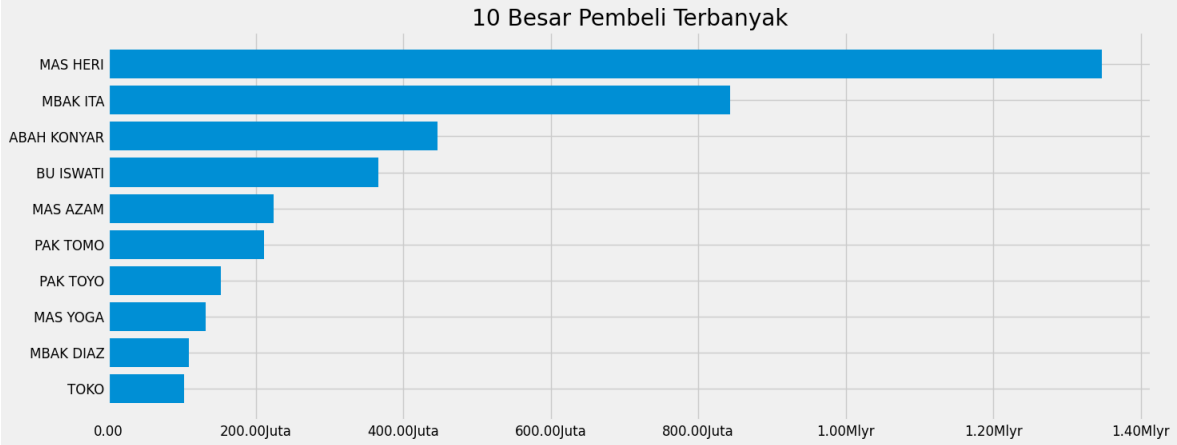
Out[52]:

	Tujuan	Jumlah
0	MAS HERI	1.347280e+09
1	MBAK ITA	8.431650e+08
2	ABAH KONYAR	4.464000e+08
3	BU ISWATI	3.660150e+08
4	MAS AZAM	2.243750e+08
...	...	...
132	BU ANI	5.400000e+05
133	PAK MUNARI	5.400000e+05
134	YOGA	5.400000e+05
135	BU AS	5.350000e+05
136	MAS RIZAK	5.250000e+05

137 rows × 2 columns

In [53]:
```
fig,ax=plt.subplots(figsize = (15, 6))
ax.barh(df_beli1['Tujuan'].head(10),df_beli1['Jumlah'].head(10))
ax.xaxis.set_major_formatter(FuncFormatter(formatuang))
ax.invert_yaxis()
```

```
ax.set_title('10 Besar Pembeli Terbanyak')
plt.show()
```



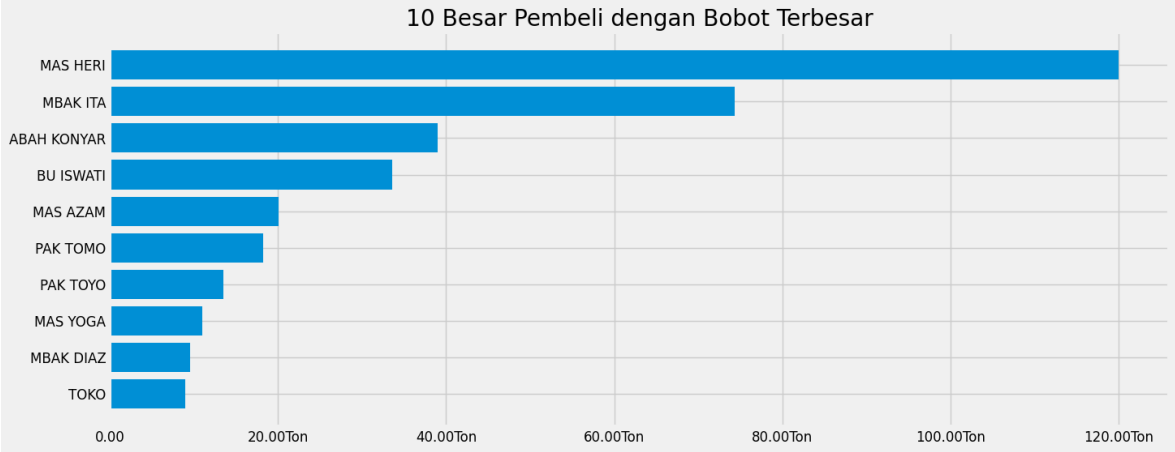
In [54]:
```
df_beli2=df_beli.copy()
df_beli2.drop(df_beli2.columns[[1]],axis=1,inplace=True)
df_beli2=df_beli2.groupby(['Tujuan']).sum()
df_beli2=df_beli2.sort_values(by=['Berat'],ascending=False).reset_index()
df_beli2
```

Out[54]:

	Tujuan	Berat
0	MAS HERI	120000
1	MBAK ITA	74350
2	ABAH KONYAR	39000
3	BU ISWATI	33600
4	MAS AZAM	20050
...	...	...
132	MAS FREN	50
133	CAK MO	50
134	PAK PAAT	50
135	PAK SUGIMAN	50
136	YOGA	50

137 rows × 2 columns

In [55]:
```
fig,ax=plt.subplots(figsize = (15, 6))
ax.barh(df_beli2['Tujuan'].head(10),df_beli2['Berat'].head(10))
ax.xaxis.set_major_formatter(FuncFormatter(formatberat))
ax.invert_yaxis()
ax.set_title('10 Besar Pembeli dengan Bobot Terbesar')
plt.show()
```



Simpulan

Pembelian dengan jumlah uang dan berat terbanyak yaitu

1. MAS HERI
2. MBAK ITA
3. ABAH KONYAR

Agregasi barang

In [56]:
```
df.Jenis.unique()
```

Out[56]:
```
array(['Lotus', 'Hiu', 'Polos', 'Pecah'], dtype=object)
```

In [108…
```
df_jenis=df.copy()
df_jenis.drop(df_jenis.columns[[1,3,4,5,6,8,9]],axis=1,inplace=True)
df_jenis.head()
```

Out[108]:

	Tanggal	Jenis	Berat
1	2023-01-02	Lotus	2000
2	2023-01-02	Lotus	1000
3	2023-01-03	Lotus	50
4	2023-01-03	Lotus	150
5	2023-01-03	Lotus	150

In [109…
```
df_jenis=df_jenis.pivot(columns=['Jenis'],values='Berat').set_index(df_jenis['Ta
df_jenis=df_jenis.groupby(['Tanggal']).sum()
df_jenis.head()
```

Out[109]:

Jenis Tanggal	Hiu	Lotus	Pecah	Polos
2023-01-02	0.0	3000.0	0.0	0.0
2023-01-03	0.0	450.0	0.0	0.0
2023-01-04	0.0	3900.0	0.0	0.0
2023-01-05	9600.0	650.0	0.0	0.0
2023-01-06	4300.0	0.0	0.0	0.0

In [83]:

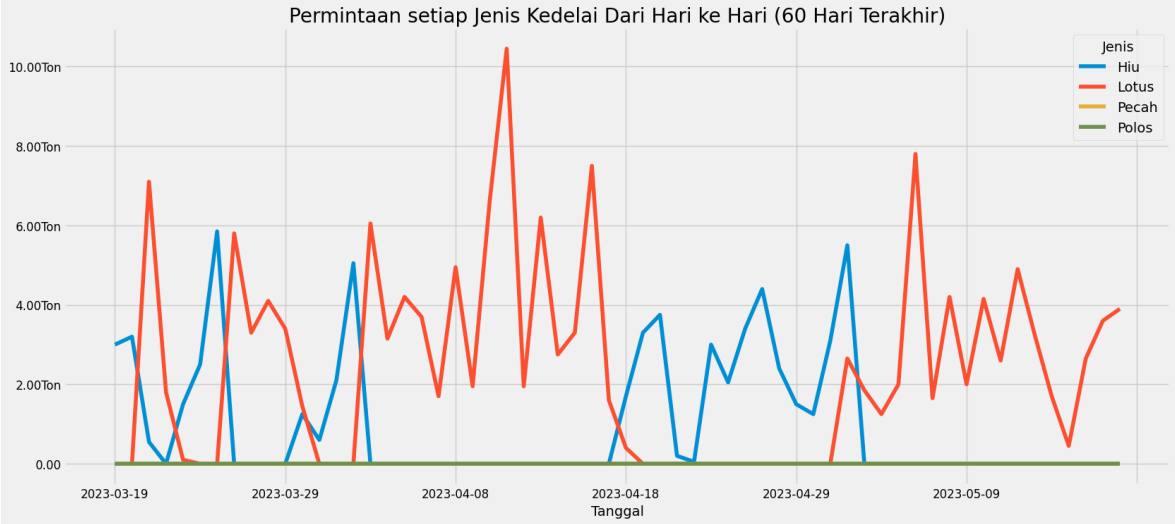
```
Lotus=[]
Hiu=[]
Polos=[]
Pecah=[]
for i in df_jenis.Jenis:
    if (i=='Lotus'):
        Lotus.append(df_jenis.Berat)
        Hiu.append(0)
        Polos.append(0)
        Pecah.append(0)
    elif (i=='Hiu'):
        Lotus.append(0)
        Hiu.append(df_jenis.Berat)
        Polos.append(0)
        Pecah.append(0)
    elif (i=='Polos'):
        Lotus.append(0)
        Hiu.append(0)
        Polos.append(df_jenis.Berat)
        Pecah.append(0)
    elif (i=='Pecah'):
        Lotus.append(0)
        Hiu.append(0)
        Polos.append(0)
        Pecah.append(df_jenis.Berat)
df_jenis['Lotus']=Lotus
df_jenis['Hiu']=Hiu
df_jenis['Polos']=Polos
df_jenis['Pecah']=Pecah
df_jenis.head()
```

Out[83]:

	Tanggal	Jenis	Berat	Lotus	Hiu	Polos	Pecah
1	2023-01-02	Lotus	2000	1 2000 2 1000 3 50 4 ...	0	0	0
2	2023-01-02	Lotus	1000	1 2000 2 1000 3 50 4 ...	0	0	0
3	2023-01-03	Lotus	50	1 2000 2 1000 3 50 4 ...	0	0	0
4	2023-01-03	Lotus	150	1 2000 2 1000 3 50 4 ...	0	0	0
5	2023-01-03	Lotus	150	1 2000 2 1000 3 50 4 ...	0	0	0

In [117…

```
df_jenis[-60:].plot(title='Permintaan setiap Jenis Kedelai Dari Hari ke Hari (60
```



Simpulan

Permintaan kedelai pada 60 hari terakhir hanya pada 2 jenis kedelai yaitu: **Lotus** dan **Hiu**

In [ ]: