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Forecast Analysis of Yearly Groundnut Productivity in India Using Auto Regressive Integrated Moving Averages model

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ABSTRACT

This **study** paper is **an observation** of **the productivity** and **production** of **peanuts** in India. **Data from** 1966-67 to 2019-20 **were** analyzed **using** time collection methods. **For the construction and forecasting of the versions from 1966-67** to 2017-18. **The** statistics **from** 2018-19 to 2019-20 **are** used for **the validation** of the **versions. For statistics, the automatic correlation function** (ACF) and **the partial automatic correlation function** (PACF) **were calculated. The** regressive **integrated moving average** version **is rising.The validity** of the version **is** examined **using well-known** statistical techniques. **The** overall **version performance** is **demonstrated** by means of **an evaluation** with **a percentage** deviation from values **and suggests** an absolute **mean percentage** error (MAPE). **For the forecast item, automatic regressive production The Integrated** Moving Averages **(0,1,1)** and Integrated Moving Averages **Auto Regressive versions (0,1,1) were used** respectively to forecast **certain key** years. **respectively of** hectares with decrease and 10.3718 hectares **of higher** restriction **lakh, the production foresees respectively about** 6.4445 heaps **of lakh with** decrease restriction and 8.6487 lakh of higher restriction. **The rising** sample **is** tested **by** means of becoming an exponential, linear function.The end result confirmed that the **linearly increasing** charge compound

Keywords: Groundnut; LGR ; CGR; forecasting; area; production; Auto Regression Integrated Moving Averages; Akaike's Information Criterion (AIC); Bayesian Information Criterion(BIC);MAPE.

1. INTRODUCTION

Groundnuts **are a vital** oilseed crop in India which occupies **the first** role in **position sentences and the second** role in **production sentences. Area** and distribution World **peanut production has reached** a **record** of **about** 21 million **tonnes. The** m**ost important peanuts that generate** international **positions** within are India, China, USA, West Africa, Sudan and Nigeria etc. **India** ranks first in the international **position (8.5** million hectares **account for about 40% of the overall international position) and production (8.4 million tons contributes about 33%** of the entire international **production). Of all the** oil crops, **peanuts charge over** 4050% **locally** and **60-70% of production in** the **United States. S.** a ..Among oil crops, **peanut** has **the first** region within the u. **S.** a .. **In** India it **is cultivated for miles over an area** of **about eighty-five** lakh hectares with the **total production** of **eighty-four** lakh **tons. Its** cultivation in India is specifically **limited** to the **states** of Gujarat, Andhra Pradesh, Tamil Nadu, Karnataka, Maharashtra, Madhya Pradesh, Uttar Pradesh, Rajasthan, Punjab and Orissa. **Approximately** 80% of the entire **site** and **84%** of **all production in the United States. S. a. are limited to the** first 5 **states. The** maximum **productivity** of **groundnuts** (1604 kg **/ ha)** is in **the state** of Tamil Nadu, **while** in Gujarat the **productivity** is **fixed at** 1190 kg **/ ha.** In Gujarat, groundnuts **are cultivated over** an a**rea of around** 20 lakh hectares with **an overall production** of **around** 26 lakh **toni per year.** According to the **Crop Insurance Report of All Kharifs of India, the Government** of India, as **of** September **twenty-six, 2019,** groundnut**s have been** sown **to approximately** 39.31 lakh ha **in the** remaining year (40.19 lakh ha **). Among** the states, Gujarat **was the first to secure the position** with **15.52** lakhs **seen across** Rajasthan (5.73 ha), Andhra Pradesh (5.37 lakh ha), Karnataka (3.88 lakh **ha).)**

and Madhya Pradesh (2.21 lakh ha). **Economic importance** The **grains** are fed both **grilled and** fried and salted. **The peanut** kernel is **made up of** approximately 4749% oil and 20% protein. **Its core** as a **whole** is **remarkably** digestible. The **grains** are eaten both roasted **and** fried and salted. **The** organic price of **peanut** protein is **part** of the maximum **plant** protein and **is equal to that** of casein. **Peanut** oil is known to be used in **the human diet, primarily** in **its ingredients, as opposed** to **several** safe oils. **Peanut** oil is **typically** used in the production of vegetable ghee. **about** thirteen and **a quarter kg of** 20 kg **/ capita recruitment** in advanced international **sites.** Groundnuts **are a vital** oilseed crop in India which occupies **the first** role in **position sentences and the second** role in **production sentences. Area** and distribution World **peanut production has reached** a **record** of **about** 21 million **tons. The** m**ost important peanuts that generate** international **positions** within are India, China, USA, West Africa, Sudan and Nigeria etc. **India** ranks first in the international **position (8.5** million hectares **account for about 40% of the overall international position) and production (8.4 million tons contributes about 33%** of the entire international **production). Of all the** oil crops, **peanuts charge over** 4050% **locally** and **60-70% of production in** the **United States. S.** a ..Among oil crops, **peanut** has **the first** region within the u. **S.** a .. **In** India it **is cultivated for miles over an area** of **about eighty-five** lakh hectares with the **total production** of **eighty-four** lakh **tons. Its** cultivation in India is specifically **limited** to the **states** of Gujarat, Andhra Pradesh, Tamil Nadu, Karnataka, Maharashtra, Madhya Pradesh, Uttar Pradesh, Rajasthan, Punjab and Orissa. **Approximately** 80% of the entire **site** and **84%** of **all production in the United States. S. a. are limited to the** first 5 **states. The** maximum **productivity** of **groundnuts** (1604 kg **/ ha)** is in **the state** of Tamil Nadu, **while** in Gujarat the **productivity** is **fixed at** 1190 kg **/ ha.**In Gujarat, groundnuts **are cultivated over** an a**rea of around** 20 lakh hectares with **an overall production** of **around** 26 lakh **tons per year.** According to the **Crop Insurance Report of All Kharif of India, the Government** of India, as **of** September **twenty-six, 2019,** groundnut**s have been** sown **to approximately** 39.31 lakh ha **in the** remaining year (40.19 lakh ha **). Among** the states, Gujarat **was the first to secure the position** with **15.52 lakhs** observed **across** Rajasthan (five**, seventy-three** lakh ha), Andhra Pradesh (five**, 37** lakh ha), Karnataka (3 **, 88** lakh ha) and Madhya Pradesh (2.21 lakh ha). **Economic importance Grains have**

2. REVIEWS OFLITERATURE

Shukla and Jharkharia (2011) made an research on applicability of Auto Regressive Integrated Moving Averages fashions in wholesale vegetable marketplace, with the aid of using taking the income facts of onion that's a perishable vegetable. The facts changed into gathered from Ahmadabad wholesale marketplace of India. The version validation changed into performed with the aid of using the use of income facts of Potato from the equal marketplace. Auto Regressive Integrated Moving Averages(2, 0, 1) version changed into the nice healthy and the parameters of the version confirmed that income withinside the modern duration changed into exceedingly motivated with the aid of using income withinside the final periods [2].

Adilet al. (2012) the use of Auto Regressive Integrated Moving Averagesversion attempted to forecast the call for and deliver in Punjab province, Pakistan. Based on ACF and PACF plots, Auto Regressive Integrated Moving Averages(1, 1, 0) changed into nice healthy for place and manufacturing while for intake of onion, Auto Regressive Integrated Moving Averages(1, 1, 1) version changed into located to

be the nice healthy. Consumption and manufacturing hole of onion changed into forecasted for the 12 months 2025. The forecasted place beneathneath onion might be 47.484 thousand hectares and forecasted manufacturing might be372.403 thousand tonnes in 2025 [3].

Sudhaet al. (2013) evaluated the increase developments in place, manufacturing and productiveness of maize among 1970-seventy one and 2008-09. Different polynomial fashions viz., linear, quadratic, cubic and different increase fashions particularly logarithmic, inverse, exponential, compound and energy fashions had been used to look at the fashion. The cubic characteristic changed into the nice equipped version for forecasting the place, manufacturing and productiveness of maize because it had maximum adjusted R2 [4].

Koujalagiet al. (2014) anticipated the increase developments in place, manufacturing, productiveness and export of pomegranate in Karnataka for the duration 1987-88 to 2009-10. The linear regression version changed into equipped one by one for place, manufacturing and productiveness of pomegranate. There is an boom in manufacturing of pomegranate which changed into inferred primarily based totally at the co-green of variation. The place beneathneath this plants considerably growing withinside the Koppal and Bagalkotdisreicts [5].

Debnathet al. (2015) foresighted on forecasting the cultivated place and manufacturing of cotton in India the use of Auto Regressive Integrated Moving Averages version. Time Series facts overlaying the duration of 1950–2010 changed into used for the Study. The look at found out that Auto Regressive Integrated Moving Averages(0, 1,0) Auto Regressive Integrated Moving Averages(1, 1, 4) and Auto Regressive Integrated Moving Averages(0, 1, 1) are the nice equipped version for forecasting of cotton place, manufacturing and yield in India respectively. The evaluation suggests that if the existing increase prices preserve then the cotton place, manufacturing and yield withinside the 12 months 2020 can be 10.ninety two million hectares, 39.19 million bales of a hundred and seventy kg of every and 527 kg/hectare respectively [6].

Sajid Ali Et Al. (2016) look at tries to forecast manufacturing and yield of principal coins plants particularly sugarcane and cotton plants of Pakistan with the aid of using the use of Auto Regressive Moving Average (ARMA) and Auto Regressive Integrated Moving Average fashions of forecasting. Using facts for 1948 to 2012, productions and yields of each plants had been forecasted for 18 years beginning from 2013 to 2030. ARMA (1, 4), ARMA (1, 1)and ARMA (0, 1) had been located suitable for sugarcane manufacturing, sugarcane yield, and cotton manufacturing respectively, while Auto Regressive Integrated Moving Averages (2, 1, 1) changed into the appropriate version for forecasting cotton yield. Some diagnostic exams had been additionally executed on equipped fashions and had been located nicely equipped [7].

3. METERIALS AND METHODS

This look at is primarily based totally on secondary facts of Groundnut crop of India for estimation of increase prices and forecasting place, manufacturing. The place, manufacturing facts for Groundnut

crop facts gathered for the duration from 1966-sixty seven to 2020-21 from Directorate of Economics and Statistics, Department of Agriculture and Cooperation, India. The facts concerning the agriculture years 1966-sixty seven to 2020-21 changed into used for the version constructing and forecasting. The facts of 2017-18 to 2020-21 changed into used for validation of the version.

3.1.Estimation of Growth Rates

The look at of facts i.e., from 1966-67 to 2020-21. Keeping the goals in view, linear increase price (LGR) and compound increase price (CGR) for the crop traits viz., place, manufacturing of Groundnut crop in India had been anticipated with the aid of using becoming the subsequent functions [9].

3.1.1.Linear increase characteristic

Linear increase characteristic is given by $Z_t = c + d_t + e_t$with the aid of using

Where, t is the time in years, unbiased variable, Zt is the fashion price of the established variable c and d are constants or parameters and et is blunders term

The above equation is equipped with the aid of using the use of the least squares approach of estimation.

The linear increase price is calculated with the aid of using the formula: Linear increase price(LGR%) = d/$\bar{y}$ X 100

3.1.2.Compound increase characteristic

Compound increase characteristic is given with the aid of using

$Z_t = cd^t$ (or) Log Zt = logc + t log d
The compound increase price (CGR %) is calculated with the aid of using the use of the formula
CGR (%) = (antilog (d-1)) X 100

3.2.Auto Regressive Integrated Moving Model

The Auto Regressive Integrated Moving Averages technique is likewise known as as Box- Jenkins technique. The Box-Jenkins process is involved with becoming a blended Auto Regressive Integrated Moving Average version to a given set of statistics. The fashions evolved through this technique are commonly known as AUTO REGRESSIVE INTEGRATED MOVING Averages fashions due to the fact they use a mixture of autoregressive (AR), integration (I) - relating to the opposite technique of differencing to provide the forecast, and shifting common (MA) operations. (Box, and G.M. Jenkin, 1976) [10]. An Auto Regressive Integrated Moving Averages version is commonly said as Auto Regressive Integrated Moving Averages(p, d, q). An autoregressive incorporated shifting common is expressed withinside the form:

If $\boldsymbol{w_t}$=$\boldsymbol{\nabla^b r_t} = (\mathbf{1} - \boldsymbol{B})^{\boldsymbol{d}} \boldsymbol{r_t}$ then

$$W_t = \beta_1 w_{t-1} + \beta_2 w_{t-2} + \cdots + \beta_p w_{p-1} + \epsilon_t - \beta_1 \epsilon_{t-1} - \beta_2 \epsilon_{t-2} - \cdots - \beta_p \epsilon_{t-p}$$

Where, is distinction operator, B is the returned shift operator, that is B($X_{t)} = X_{t-1}$

p denotes the wide variety of autoregressive terms, q wide variety of shifting common terms, d wide variety of instances a sequence need to be differenced to result in stationarity. The primary goal in becoming this Auto Regressive Integrated Moving Averages version is to discover the stochastic technique of the time collection and expect the destiny values accurately. These strategies have additionally been beneficial in lots of varieties of state of affairs which contain the constructing of fashions for discrete time collection and dynamic systems. But this technique turned into now no longer properly for lead instances or for seasonal collection with a big random component. A stochastic technique is desk bound or non- desk bound. The first aspect to notice is that need to time collection are non-desk bound and the Averages version refer most effective to a desk bound time collection. Since the Auto Regressive Integrated Moving Averages fashions refer most effective to a desk bound time collection, the primary level of Box-Jenkins version is lowering non-desk bound collection to a desk bound collection through taking first order differences. The primary tiers in putting in a Box-Jenkins forecasting version are as follows. 1) Identification 2) Estimating the parameters three) Diagnostic checking and four) Forecasting three.

3.3.Identification Stage

The time harvest statistics related **test** was carried out, which revealed that the peanuts house, which produces for India. Non-stationary time **collection statistics** were limited to the office by first-order differentiation, and good habits of autoregressive integrated moving averages had shifted **the** use of **statistics from** 1966 to 67 to **2017 18** and **used to** predict **cultivable** location, production from **India for the** next **5 years.** The integrated autoregressive moving average modes were **diagnosed** by identifying **the preliminary values** of **the orders of** the non-seasonal parameters "p" **and** "q". They were **received** by looking for huge peaks **in** the autocorrelation **and partial autocorrelation functions.** At **the** level of identity, **one or** more models were selected **which** seem **to offer** a statistically correct **illustration of the statistics** available. Therefore, a specific **estimate of** the least squares version parameter was **received.**.

3.4.Estimation Stage

Auto Regressive Integrated Moving Averages fashions are outfitted and accuracy of the version turned into examined on the idea of diagnostics statistics.

3.5 Diagnostic Checking

The great healthy version turned into decided on primarily based totally on the subsequent diagnostics.

Low Akaike Information Criteria (AIC): - AIC is predicted through

AIC = (-2 log L + 2 m), in which m = p+ q and L is the probability function. Sometimes, SBC is likewise used and predicted through SBC =logσ2+ (m log n)/n.

3.6.Forecasting Accuracy Checking

Among the superb geared up **Auto Regressive Integrated Moving Averages and exponential smoothing** technique **a** superb model **is used for forecasting** based totally absolutely on the **accuracy of the** sorting out**. The accuracy is checked** the usage of **measures** specifically **RMSE and MAPE. A** foremost part of **the** information **used for** model turning into **is** called **as** education **set and a smaller portion (**generally **10%) of** information **used for checking forecasting accuracy is** called **as** sorting out **set**

3.7.Forecasting

The latest **version is used to generate predictions o**n fate **values.** R **software** has become **used for** the evaluation of time **collection and** growth modes **and** predictions of automatic regressive integrated moving averages.

4.RESULTS AND DISCUSSION

4.1Estimation of Growth Rates

The linear and compound boom prices at some stage in the look at duration had been 0.ninety six and 1.23 in keeping with cent in keeping with annum respectively for place of groundnut crop 2.89 and 3.16 in keeping with cent in keeping with annum respectively for manufacturing of groundnut crop in India. It exhibited a high quality tremendous fashion for place and manufacturing below groundnut crop in India. Table 1 proven linear and compound boom prices of Groundnut place and production with 1 in keeping with cent significance level

Table-1: Growth rates for area, production of Groundnut crop in India

India	LGR (%)	CGR (%)
Area	0.96**	1.23**
Production	2.89**	3.16**

*** Significance at 1% level*

Table-2: Values of Auto Correlation Function and Partial Correlation Function of Area and Production of Groundnut Data.

Lag	Auto Correlation Function(ACF)-Area	Partial Correlation Function(PACF)-Area	Auto Correlation Function(ACF)-Production	Partial Correlation Function(PACF) – Production
0	1.000		1.000	
1	-0.522	-0.522	-0.396	-0.522
2	0.119	-0.211	0.045	-0.211
3	-0.128	-0.235	-0.172	-0.235
4	0.093	-0.112	0.091	-0.122
5	0.015	0.013	0.156	0.013
6	-0.164	-0.210	-0.154	-0.210
7	0.109	-0.133	0.027	-0.133
8	-0.116	-0.226	-0.193	-0.226
9	0.141	-0.118	0.205	-0.118

10	-0.107	-0.141	-0.116	-0.141
11	0.194	0.110	0.096	0.110
12	-0.238	-0.140	-0.044	-0.140
13	0.266	0.136	-0.191	0.136
14	-0.193	-0.003	0.133	-0.003
15	0.128	0.101	0.034	0.101
16	-0.136	-0.018	-0.012	-0.018
17	0.073	0.089	0.017	0.089

Table-3:AIC and BIC values for tentative AUTO REGRESSIVE INTEGRATED MOVING AVERAGES Models

S.No	Groundnut	Auto Regressive Integrated Moving Averages (p, d, q)	AIC	AICc	BIC	σ^2(Variance)
1	Area	1, 0, 1	96.37	97.17	104.4	0.2961
		1, 1, 1	90.64	91.12	96.61	0.2890
		0, 1, 1	**89.16**	**89.40**	**93.14**	**0.2864**
		0, 1, 2	90.69	91.17	96.66	0.2892
2	Production	1, 0, 1	61.49	62.29	69.52	0.1557
		1, 1, 1	56.15	56.63	62.11	0.1534
		0, 1, 1	**54.17**	**54.41**	**58.15**	**0.1506**
		0, 1, 2	56.14	56.62	62.11	0.1534

Table-4:Evaluations of the fitted Auto Regressive Integrated Moving Averages model for AREA of Groundnut

ME	RMSE	MAE	MPE	MAPE	MASE	ACF1
0.1364	0.5253	0.3509	1.4632	4.6128	0.9068	-0.1482

Table-5:Evaluations of the fitted Auto Regressive Integrated Moving Averages model for PRODUCTION of Groundnut

ME	RMSE	MAE	MPE	MAPE	MASE	ACF1
0.0966	0.3809	0.2884	1.3747	4.9429	0.9441	-0.0802

ME- Mean Error, RMSE- Root Mean Square Error, MAE- Mean Absolute Error, MPA- Mean Percentage Error, MAPE- Mean Absolute Percentage Error, MASE- Mean absolute Scaled Error, ACF- Auto Correlation Function

Table-6:Forecast-Area with Confidence Limits at 95%

Year	Point Forecast	Low 95%	High 95%
2018	9.163451	8.168775	10.15813
2019	9.224593	8.219740	10.22945
2020	9.285734	8.270792	10.30068
2021	9.346875	8.321930	10.37182
2022	9.408017	8.373151	10.44288
2023	9.469158	8.424452	10.51386
2024	9.530300	8.475832	10.58477
2025	9.591441	8.527288	10.65559
2026	9.652583	8.578818	10.72635
2027	9.713724	8.630420	10.79703
2028	9.774865	8.682092	10.86764
2029	9.836007	8.733833	10.93818

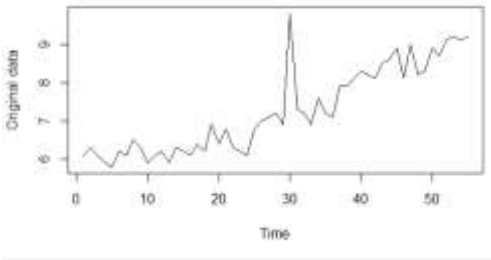
Table-7:Forecast-Production with Confidence Limits at 95%

Year	point Forecast	L 95%	H 95%
2018	7.546681	6.786098	8.307265
2019	7.576271	6.657556	8.435807
2020	7.592361	6.545382	8.547981
2021	7.612361	6.444566	8.648797
2022	7.696211	6.352230	8.741133
2023	7.752341	6.266536	8.826827
2024	7.823631	6.186230	8.907133
2025	8.023123	6.110406	8.982957
2026	8.123561	6.038390	9.054973
2027	8.512341	5.969659	9.123704
2028	9.023522	6.132565	9.978623
2029	9.756983	6.867522	10.02356

Table-8:ACF and PACF values of Residuals at AUTO REGRESSION INTEGRATED MOVING AVERAGES(0,1,1) Area and Production of Groundnut

Lag	ACF-Area	PACF-Area	ACF-Production	PACF-Production
0	1.000		1.000	
1	0.008	0.008	0.008	0.008
2	-0.003	-0.003	-0.003	-0.003

3	-0.129	-0.129	-0.129	-0.129
4	0.103	0.107	0.103	0.107
5	0.135	0.136	0.135	0.136
6	-0.140	-0.168	-0.140	-0.168
7	-0.104	-0.079	-0.104	-0.079
8	-0.187	-0.165	-0.187	-0.165
9	0.100	0.044	0.100	0.044
10	-0.072	-0.085	-0.072	-0.085
11	0.016	0.033	0.016	0.033
12	-0.126	-0.079	-0.126	-0.079
13	-0.124	-0.258	-0.124	-0.258
14	0.069	0.021	0.069	0.021
15	0.055	0.045	0.055	0.045
16	-0.022	-0.127	-0.022	-0.127
17	-0.026	0.077	-0.026	0.077



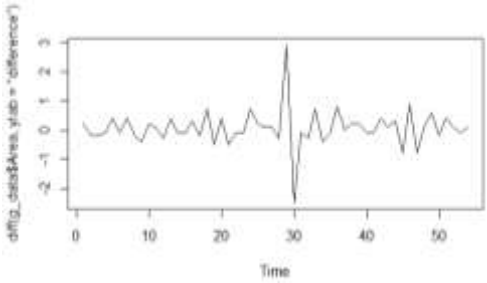
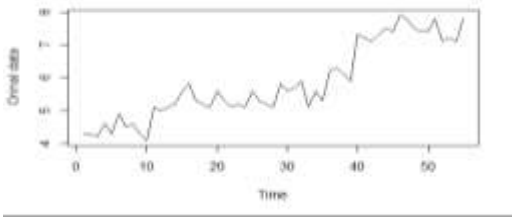


Fig-1(a): Original data -Area

Fig1(b): First Differences -Area



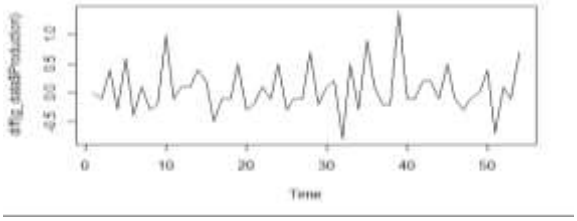


Fig-2(a): Original data-Production

Fig-2(b): First Differences-Production

4.2.Build Auto Regressive Integrated Moving Averages model for Area and Production of Groundnut Crop

4.2.1.Identification

The first step in the analysis was to **follow** the data **provided. Figure 1** shows the **graph** of **groundnut crop**

area and production **in** India from 196667 to 201718. **Examination** of **Figure** 1 revealed a positive trend over time **indicating** the **non-stationary** nature of the series. **. This** was confirmed **by** the **autocorrelation function** (ACF) **and the partial autocorrelation function** (PACF). **To** make the series stationary, **these are the first** differences after which the data **reached the stationarity** of **the area** and **the production** of **the peanut** crop as shown in Fig**ure 2.**The next step is to identify the values **of** p and q. **For** this, the autocorrelation and partial autocorrelation coefficients of **different** orders of tare **X were calculated** (Table 2). **Fig. 3** and Fig. **4** show **the area** and production data, **the autocorrelation function** (ACF) and **the partial automatic correlation function** (PACF). **We** checked eight **intermediate** models **of integrated autoregressive moving averages and** chose a model **with** a minimum **of AIC** (Akaike Information Criterion) and SBC (Schwartz Bayesian Criterion). **BIC,** we select **the appropriate model** is **the automatic regressive integrated moving averages (0,** 1, 1) for **peanut** area, **the automatic regressive integrated moving averages (0, 1.1)** for **peanut** production **have** the AIC **values and** SBC **plus bass.** Shown in Table **3.**

4.3.Model Estimation and Verification

Indian groundnut **area,** the parameters of the production **model were estimated using** software R. The results **of** the estimation **are reported.** The **values** predicted using automatic regressive integrated moving averages **with model fit statistics** such as RMSE **and MAPE values** are shown **in Table 4, Table 5.** Model **verification** involves **checking the** model residual for **see if** it contains **systematic** models. **which** can still be **removed to improve the** selected autoregressive integrated moving averages.

4.4.Diagnostic Checking

Examining the auto correlations and partial auto correlations of the residuals of various orders. Fig. 5 shown the ACF and PACF of the residual and Box L-Jung statistic non-significant result also indicate "good fit" of the model.

4.5 Forecasting

The forecast **of** peanut crop area **and production in India was** made **for the six years using the integrated** autoregressive moving average (0, **1, 1) production model** of peanut area and crops. Auto regressive integrated regressive moving averages (0,1,1). The predicted **values** are **shown in Table 6.** Therefore, the **production models** of the peanut zone and the integrated autoregressive moving averages (0,1,1) turned out to be **the best with** an **R2 value of 98** , 00%. The **accuracy of** the predictions **for Exante and Expost were tested using the following** tests, **such as Mean** Square Error **(MSE) and Mean Absolute** Percent Error **(MAPE).** Automatic regressive integrated moving average **models are** mainly developed **to** predict **the corresponding variable. An important measure of the** accuracy of the sample **period forecast was** calculated to judge the predictive ability of the fitted automatic regressive integrated moving averages model. ..

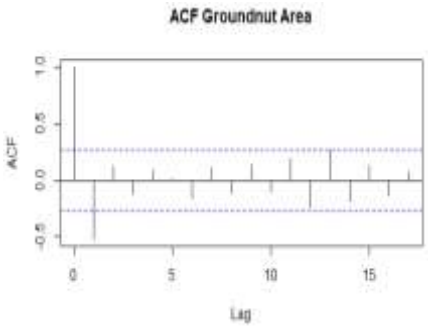


Fig-3(a): ACF- Area

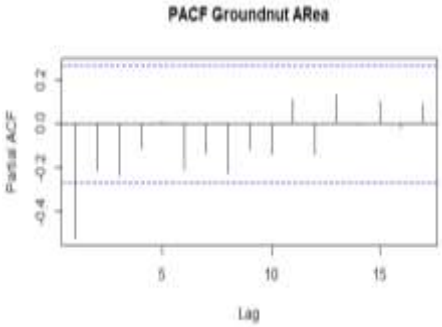


Fig-3(b):PACF- Area

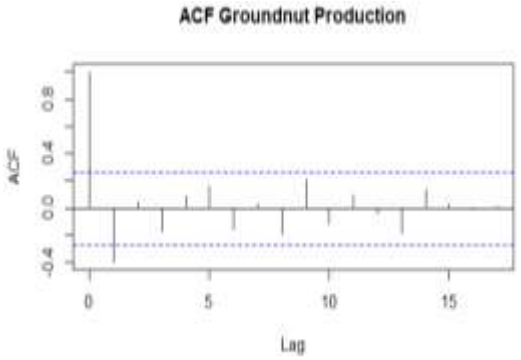


Fig-4(a): ACF-Production

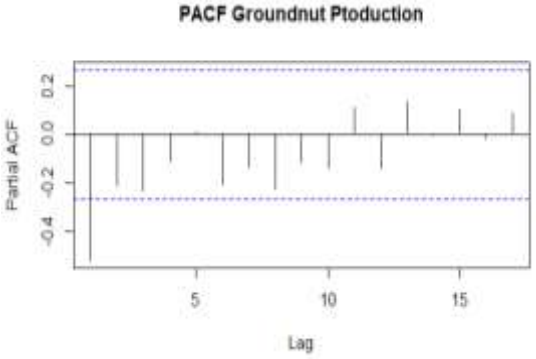


Fig-4(b): PACF- Production

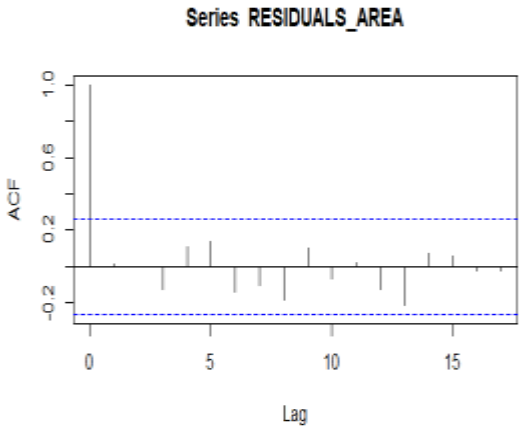


Fig-5(a): Residuals ACF –Area

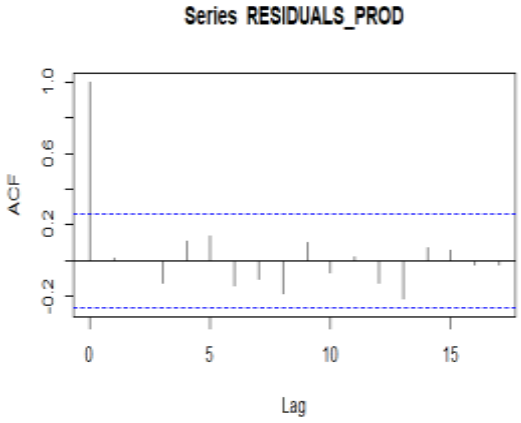
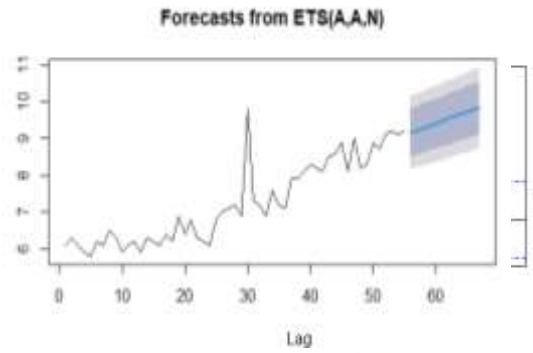
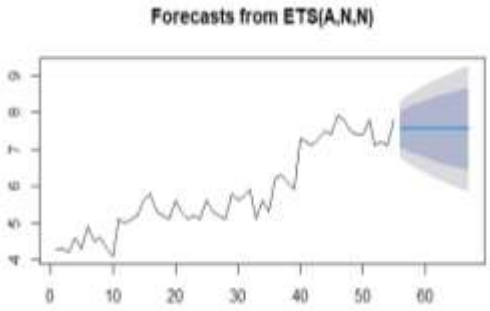


Fig-5(b): Residuals PACF -area





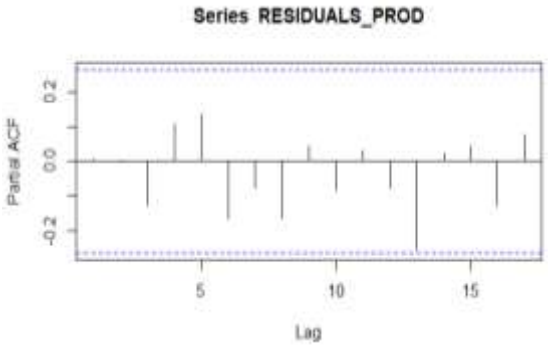


Fig-6(a): Residuals ACF – Production Fig-6(b): Residuals PACF - Production Fig-7: Forecast of Groundnut area Fig-8: Forecast of Groundnut production

5. CONCLUSION

In this **study,** the **model developed** for **the peanut** area, production **was found** to **be, respectively, integrated autoregressive moving averages (0,** 1, 1) and **integrated regressive autoregressive moving averages (0,** 1, 1). **From** the **forecasts** available using the developed model, it **is clear** that **the area** cultivated **with groundnuts is expected to experience a positive** trend in **production in the coming** years. **The** validity of the **predicted** value can be **verified** when the data for the lead periods **is** available. **Significant** for **the area, the production** for the study period **indicates** that **adequate** measures **must** be taken to a**dd value to groundnuts** in India

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