**IMPACT AND VARIABILITY OF CLIMATIC FACTOR SON THE YIELD OF TOMATOES IN NIGERIA**

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**ABSTRACT:** Climatic factor is one of the vital issues facing farming in Nigeria. It is very challenging for the farmer when the climatic conditionisnotfavorabletotheirproduct. So, this paper used correlation to shows the degree of association between the climatic factors for year 2019 and 2021. For year 2019, the correlation analysis indicates that, the correlation between the climatic factor positively influence the production of tomatoes in Nigeria except the correlation climatic factor RAIN and any other climatic factor, which do not really have influence on the performance (yield) of tomatoes in Nigeria. Foryear2021, the correlation analysis indicates that, the correlation between the climatic factor positively influence the production (yield) of tomatoes in Nigeria except the correlation between TMEAN & RH and TMAX & RH, which influence the production of tomatoes negatively. The analysis of variance (ANOVA) shows the variability in the four (4) varieties of tomatoes that, the varieties of tomatoes significantly contribute to the growth of tomatoes which can influence the yield of tomatoes in Nigeria positively.

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**Keywords**: Climate factor, Significantly, Tomatoes, Variability-analysis, Negatively, Association, Correlation.

**INTRODUCTION**

Amomentouschangeinclimateonauniversalscalewillimpactagricultureandaccordinglyaffecttheworld’sfoodsupply.Climatechangeintrinsicallyisnotnecessarilyharmfulbuttheproblemsarisefromeventsthataredifficulttopredict.Therecordsofinconsistentrainfallpatternsandunpredictablehightemperaturespellsconsequentlyreducecropproductivityinthetropics.Latitudinalandaltitudinalshiftsinecologicalandagro-economiczones, land degradation, extreme geophysicalevents,reducedwateravailability,theriseinsealevelandsalinizationaresuggested,unlesspromptdecisionareundertakentomitigatetheeffectsofclimatechange,foodsecurityindevelopingcountrieswillbeunderthreat.Inthehumidtropics,therainy(wet)andlate(dry)sowingseasonsareassociatedwithchangesinclimaticattributeswhichtoagreatextentinfluencetheproductivityofagriculturalfood(vegetablecrops).Vegetablesarethebestmeansofovercomingmicronutrientdeficienciesandprovidepeasantfarmerswithsustenanceincomeandmorejobsperhectarethanstaplecrops.Broadly,vegetablecropsaresensitivetoenvironmentalcondition,hightemperaturesandexcessivesoilmoisture(rainfall),whicharethemajorcausesoflowyieldsinthetropicsandthiscanbefurtherexaggeratedbyotherclimaticfactorssuchasradiationandcloudcover.Tomato,cabbage,onion,hotpepperandeggplantareamongfewimportantvegetablesconsumedandorprocessedforutilizationinAsiaandSub-SaharanAfricaregion.Tomato(LycopersiconesculentumMill.),animportanthorticulturalcropgrownworldwideisafruitvegetablebelongstotheSolanaceae.Developingcountries’agriculturalsystemsarevulnerabletoclimatechangebecausetheytendtobelesscapitalandtechnologyintensiveandbecausetheytendtobeinclimatezonesthatarealreadytoohotandwillprobablygethotter(14).Manycountriesintropicalregionsareexpectedtobemorevulnerabletowarmingbecauseadditionalwarmingwillaffecttheirmarginalwaterbalance..InthesouthernAfricanregions,theeffectofclimatechangecouldbeexacerbatedfurtherduetoitshighriskcroppingenvironmentandthemarkedintra-seasonalandinter-annualvariabilityofrainfall(6).Theaimofthispaperistodeterminehowclimatechangemayinfluencetheproductionoftomatoes(Lycopersiconesculentum)inNigeria,whiletheobjectiveswere;todeterminethemonthlymeanweatherrecordedfromthemeteorologicalunitforyear2019and2021,toevaluatethecorrelationbetweentheweatherparametersonmonthlyrecordsforyear2019and2021andtoanalyzetheimpactofclimatevariabilitybasedondifferentvarietiesoftomatoeswiththeirrespectiveweightsontomatoesproductioninNigeriausingANOVA..Nigeriahasaspatialvariationoftomatoproductionandclimatechangeorvariability.ThisresearchusedFederalUniversityofTechnology,Akure(FUTA)tomatofarmclimaticchangedatasetontomatoproduction.DuringrainyseasonsinNigeria,floodingmayoccurinoverextensiveareaswithinAkure.ThepotentialforclimatechangeinAkureasinducedbyglobalwarmingisthereforeanissueofgreatimportanceinNigeria.

**2.1RELATEDSTUDY**

Anincrementofthismagnitudeisexpectedtoaffectglobalagriculturesignificantly(4).Inaddition,suchchangesinclimaticconditionscouldprofoundlyaffectthepopulationdynamicsandthedistributionofcroppestsasreportedin(24).Theseeffectscouldeitherbedirect,throughtheinfluencethatweathermayhaveontheinsects’physiologyandbehavior(9);(10);(2);(21);(19);(15),ormaybemediatedbyhostplants,competitorsornaturalenemies(9);(2).Intemperateregions,mostinsectshavetheirgrowthperiodduringthewarmerpartoftheyear(2).Inthefirstcase,thegeneralpredictionisthatifglobaltemperaturesincrease,thespecieswillshifttheirgeographicalrangesclosertothepolesortohigherelevations,andincreasetheirpopulationsize(23;9;2;21).Inagreementwiththisprediction,manyexamplesmaybefoundintheliterature(8;18;16).

Speciesdistributionsareexpectedtochangedramaticallyinresponsetofuture

rapidclimatewarming(1),andgenerallyclimatechangemodellingpredictsthattherisksofspecieslosswillincrease(17).Therefore,improvingourunderstandingofthefactorscontrollingpotentialspeciesdistributionsunderfutureglobalwarmingscenarioshasbecomeacentralgoalinecologytoday(7).Predictionofknownoccurrencesofglobalwarmingconstitutesanimportanttechniqueinanalyticalbiology,withapplicationsinconservationmodelingofspecies’geographicdistributionsbasedontheenvironmentalconditionsofsitesandreserveplanning,ecology,evolution,epidemiology,invasivespeciesmanagementandotherfields(20;22).Globalwarmingposesasignificantthreattofutureeconomicactivitiesandthewellbeingofasignificantnumberofhumanbeings(11).Amongalleconomicsectors,theagriculturalsectorappearstobethemostsensitiveandvulnerable(3).Plantproductionisinfluencedbyclimatefactorssuchastemperatureandrainfall.Eachcrophasoptimalconditionsforgrowth.Therefore,anychangeintheclimatecanhaveaseriousimpactonthecropproductionsector.Ithasbeenshownthatatgloballevel,theimpactswillbesmallsinceproductionreductioninsomeareasisbalancedbygainsinothers(12).

Overall,climaticchangeswillaffectagricultureeithernegativelyorpositivelydependingonthelocation.ThereiswideconcernthattheagriculturalsectorinAfricawillbeespeciallysensitivetofutureclimatechangeandvariability(14).Inthispaper,thetomatocropwasused.Thetomato(Lycopersiconesculentum)belongstothefamilyofSolanaceae.Itiscommerciallyimportantglobally,forboththefreshfruitmarketandtheprocessedfoodindustriesTheTomatooriginatedinthedrywestcoastoftropicalSouthAmerica.Thegrowingseasoninthisregionhastemperaturesthataremoderatewithanaverageminimumnighttemperatureof15°Candaveragemaximumdaytemperatureof19°C(5).Theplantthrivesintemperaturesbetween10°Cand30°Candistolerantofneitherfrostnorwaterloggedconditions(13).

**3.METHODOLOGY**

ThispaperwascarriedoutattheResearchFarmoftheFederalUniversityofTechnology,Akure,(lat7.17°N,long5.8°E),atropicalrainforestzoneofsouthernNigeriaTheclimateoftheareawascharacterizedbyheavyrainfallduringthemonthsfromApriltoJulyandAugusttoNovember.Thesandyloamsoilatthesiteofstudyisanalfisolclassifiedasclayeyskeletaloxic-paleustalf(USDASoilSurveyStaff,2009). The nutrient statusofsurfacesoilfor0-15 cm at the experimental site before planting are: pH6.8;N (0.19mg/kg); P(7.69mg/kg); K, Ca and Mg (1.75, 0.84,4.39cmol/kgsoilrespectively);organicmatter(2.42g/kg),bulkdensity(1.28mg/m3).Thefieldsitewasmanuallycleared.Seedsoffourtomatovarieties:Ibadanlocal(Ib.local),UC,RomaVFandBeskewerenursedon5thofMarch,2019forearly/rainingseasonplantingandtransplantedtothefieldon2ndofApril,2019.Thelateseasonplantingwason4thofSeptemberandtransplantedtothefieldon1stofOctober.Theexperimentwasrepeatedinthecroppingseasonsofyear2020.TheexperimentaldesignwasaRandomizedCompleteBlockDesign(RCBD)withthreereplications.Theunitplotsizewas2mx2m.Thetomatovarietyseedswerenursedinawellpulverizedrichloamysoilandwastransplantedintothefieldafter5weeksataplantingdistanceof90cmby30cm.Twoweeksintervalrecordsofplantheight(cm),numberofleavesperplant,leafareaperplant(cm2),dryweightofleavesandfruitsperplant(g),numberofflowerclustersperplant,numberoffruitsperplant,weightofindividualfruit(g),weightoffruitsperplant(kg),weightoffruitsperplot(kg)andfruityield(t/ha)weretakenuptomaturityandtomatoyieldwasassessedatthefinalharvest.Weatherdataincludesrainfall(RR),maximumtemperature(T\_max),minimumtemperature(Tmin)andrelativehumidity(R/H)wastakensimultaneouslyonweeklybasisintwoplantingseasons.DatawereanalyzedtoestablishtherelationshipbetweenvariousgrowthstagesandweatherelementsconsideredusingmultiplecorrelationmethodandANOVA.

**3.1 VARIABILITYANALYSIS**

ThedatawereanalyzedbytheuseofIBMSPSSStatisticsversion17andRpackages.Whilethedescriptivestatisticswererepresentedintheformoftablesandgraphs,theinferentialstatisticsinvolvedtheuseofmultiplecorrectionandanalysisofvariance(ANOVA).ThemultiplecorrelationswasusedtoestablishthedegreeofassociationbetweendifferentclimaticconditionswhiletheANOVAtestformeansanalysiswasemployedtofurthertestthesignificanceoftherelationshipsbetweendifferentweathervariabilityontomatoproductionat5percentsignificanceleveland95percentconfidencelevelforyear2019and2021.

ThemultiplecoefficientsdenotingacorrelationofonevariablewithothervariablesdenotedasRABCD…KwhichdenotethatAiscorrelatedwithB, C, and Dupto K. For example, ifyouwanttocomputemultiplecorrelationsbetweenA,B,and C, it can be express as

RA.BC=

WhereRA.BCisthemultiplecorrelationsbetweenAandlinearcombinationbetweenBandC,ГABisthecorrelationbetweenAandB, ГACisthecorrelationbetweenA and CandГBCis the correlationbetweenBandC.

Signific ancetesting of

Ho:=0

Against

H1:≠0

­Thepopulationvalueofis.Hence,isanestimatorof

Teststatistic:TheFstatisticisusedfortestingthesignificanceofandisgivenas

Fcal=andFtab=

Where which is the percentage of varianceintheconstantvariableexplainedbylinearcombinationoftheregressionmodel.

**4.0ANALYSISOFDATA**

**MONTHLY DATA RECORD FOR YEAR 2019 AND 2021 AT THERE SEARCH FARM OF THE FEDERAL UNIVERSITY OF TECHNOLOGY, AKURE(FUTA)**

**Table4.1:Monthlydatarecordforyear2019atFUTAresearchfarm**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 2019 | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| Tmean | 25.9 | 26.5 | 26.7 | 26.6 | 26.0 | 25.2 | 24.3 | 24.6 | 24.8 | 25.1 | 25.4 | 25.2 |
| Tmin | 21.9 | 22.9 | 23.8 | 23.5 | 23.3 | 22.8 | 22.0 | 21.8 | 22.4 | 22.6 | 22.8 | 21.6 |
| Tmax | 30.4 | 31.0 | 30.7 | 30.6 | 29.6 | 28.5 | 27.5 | 28.4 | 28.0 | 28.6 | 28.6 | 29.2 |
| RH | 89.1 | 83.4 | 84.7 | 84.4 | 87.0 | 89.4 | 90.4 | 88.2 | 90.5 | 89.4 | 89.9 | 83.7 |
| Rain | 51.6 | 99.1 | 120.0 | 439.2 | 281.4 | 466.6 | 119.6 | 83.6 | 343.6 | 247.5 | 411.5 | 101.6 |
| Wind speed | 1.9 | 2.2 | 2.4 | 2.1 | 2.0 | 2.2 | 2.5 | 2.6 | 2.2 | 1.9 | 1.8 | 1.9 |

**Table4.2:Monthlydatarecordforyear2021atFUTAresearchfarm**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 2021 | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| Tmean | 25.9 | 26.5 | 26.5 | 26.2 | 26.2 | 25.6 | 24.8 | 24.5 | 25.1 | 25.7 | 25.1 | 25.9 |
| Tmin | 22.1 | 22.8 | 23.6 | 23.4 | 23.3 | 23.3 | 22.2 | 22.2 | 22.6 | 22.8 | 22.6 | 21.9 |
| Tmax | 30.3 | 31.1 | 30.3 | 29.9 | 29.8 | 28.8 | 27.8 | 27.8 | 28.3 | 29.2 | 28.3 | 30.3 |
| RH | 79.1 | 81.2 | 85.5 | 86.2 | 86.2 | 89.8 | 90.5 | 90.5 | 90.0 | 88.1 | 90.0 | 77.8 |
| Rain | 36.3 | 80.6 | 224.8 | 433.0 | 489.5 | 339.0 | 154.6 | 452.5 | 223.9 | 419.6 | 223.9 | 20.7 |
| Wind speed | 1.8 | 1.9 | 2.3 | 2.1 | 1.8 | 2.2 | 2.6 | 2.2 | 1.9 | 1.7 | 1.9 | 1.6 |

**Table4.3:Growthandyieldearlyrainfedandlaterainfedseasonoftomatoes.**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Seasonsofsowing | Root weights (g) | Shoot weights (g) | No. of branches | Plant height (cm) | 50 % flowering days | Fruit weights (g) | Fruit yield (kg/ha) |
| Early (rainfed) (March-June) | 14.7 | 33.1 | 22 | 122 | 56 | 15720 | 4.37 |
| Late (rainfed) (August-December) | 13.4 | 31.2 | 19 | 109 | 54 | 12847 | 3.12 |

**Table4.4:Varietaleffects(acrosstheseasons)ontheperformanceoftomatoes**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Varieties | Root weights(kg) | Shoot weight(g) | No.ofbranches | Plant height  (cm) | 50%floweringdays | Fruit weight  (g) | Fruit yield  (kg/ha) | Harvest index |
| Beske | 11.24 | 1210.3 | 17.5 | 104.7 | 54.3 | 346.9 | 19354.7 | 0.31 |
| Ibadan local | 11.43 | 1950 | 21.0 | 123.4 | 53.3 | 369.5 | 20447.3 | 0.22 |
| Romavf | 7.82 | 415.3 | 11.3 | 80 | 55.7 | 134.8 | 9320.5 | 0.33 |
| VC | 9.9 | 330.5 | 9.7 | 76 | 56 | 120.2 | 6348.2 | 0.33 |

**4.2CORRELATIONBETWEENTHEDIFFERENTCLIMATICFACTORS**

Table4.5:Degreeofrelationshipbetweentheclimaticfactorsforthemonthsintheyear2019

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | RH | RAIN | WD | TMEAN | TMIN | TMAX |
| RH | 1.0000 |  |  |  |  |  |
| RAIN | 0.4219 | 1.0000 |  |  |  |  |
| WD | 0.9190 | 0.2627 | 1.0000 |  |  |  |
| TMEAN | 0.9802 | 0.3997 | 0.9083 | 1.0000 |  |  |
| TMIN | 0.9735 | 0.3682 | 0.9046 | 0.9989 | 1.0000 |  |
| TMAX | 0.9847 | 0.4415 | 0.9174 | 0.9970 | 0.9924 | 1.000 |

Table4.5showsthecorrelationsbetweentheclimaticfactorsarepositiveandstatisticallysignificantat5%level.However,thedegreeofassociationbetweenRAINandWD,TMEAN,TMINandTMAXisweakpositivewhiletherestassociationsarestrongpositive.Theseindicatesthat,thecombinationsofclimaticfactorRAINandanyotherfactorsdonotreallyhaveeffectontheproductionoftomatoesinNigeriawhilethecombinationsofotherfactorsareveryimportantfactorstoinfluencetheyieldoftomatoesinNigeriapositively.Thatis,theyieldoftomatoesinNigeriaforyear2019withreferencetothecombinationsofclimaticfactorsWD,TMAX,TMIN,RHandTMEANwillgivemuchquantityofqualitytomatoes.

Table4.6:Degreeofrelationshipbetweentheclimaticfactorsforthemonthsintheyear2021

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | TMEAN | TMIN | TMAX | RH | RAIN | WD |
| TMEAN | 1.0000 |  |  |  |  |  |
| TMIN | 0.5543 | 1.0000 |  |  |  |  |
| TMAX | 0.9380 | 0.2563 | 1.0000 |  |  |  |
| RH | -0.6497 | 0.2500 | -0.8549 | 1.0000 |  |  |
| RAIN | -0.1354 | 0.5402 | -0.3510 | 0.6226 | 1.0000 |  |
| WD | -0.3311 | 0.2015 | -0.4544 | 0.5504 | 0.1328 | 1.0000 |

Table4.6showsthecorrelationsbetweentheclimaticfactorsTMEAN&TMIN, TMEAN&TMAX, RAIN&TMIN, RH&RAINandWD&RHarestrongpositive, which indicates therelationshipbetweenthosecombinations would havepositiveinfluence(qualityandquantity) on the yieldoftomatoesinNigeria.

ThecorrelationbetweentheclimaticfactorsTMEAN&RHandTMAX&RHisastrongnegativerelationshipwhichindicatesthat,thecombinationofthefactorshasaverystrongnegativeinfluenceontheyieldoftomatoesinNigeria.

ThecorrelationsbetweentheclimaticfactorsTMIN&TMAX, TMIN&RH, TMIN & WD and RAIN and WD is aweak positiverelationshipwhichindicatesthat, the combination of thefactorsmayormaynotreallyhaveany positive influenceontheyield(qualityandquantity)of tomatoes in Nigeria.

ThecorrelationsbetweentheclimaticfactorsTMEAN&RAIN, TMEAN&WDand TMAX&RAIN is a weak negativerelationshipwhichindicatesthat,thecombinationofthefactorsmayormaynotreallyhaveanynegativeinfluenceontheyield(qualityandquantity)oftomatoesinNigeria.

|  |
| --- |
| **4.2.1ASSUMPTIONOFNORMALITY**    Figure4.1plotofweightsoftomatoeswithanormalitycurve |

**4.2.2ANALYSISOFVARIANCEONTHEWEIGHTSOFTOMATOES**

Table4.7:analysisofvarianceonvarietaleffects(acrossseason)oftheperformanceoftomatoes

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Sourceofvariation | Degreeoffreedom | Sumofsquares | Meansumofsquares | F–ratio | Pr(>F) |
| Treatment | 3 | 5.902 | 1.967 | 2.819 | 0.130 |
| Blocks | 2 | 241.075 | 120.538 | 172.704 | 0.000 |
| Error | 6 | 4.188 | 0.698 |  |  |
| Total | 11 | 421.990 |  |  |  |

­Table4.7showstheresultoftheanalysisofvarianceonvarietaleffectsoftheperformanceoftomatoesandtheinterpretationisasfollows:

Comparisonsoftreatmenteffects

Ho: thetreatmentmeansarenotsignificantlydifferent

H1:thetreatmentmeansaresignificantlydifferent

α=0.05

P–value=0.130

Decision rule: rejectHoifP–valueissignificantlylessthanthelevelofsignificanceα, otherwise accept.

Conclusion: lookingattheaboveanalysis, P–valuewhichis0.130isgreaterthanthelevelofsignificanceα=0.05, wedonotrejectHoandconcludethatthemeansofthetreatmenteffectsarenotsignificantlydifference.Simplyput,thevarietiesofthetomatoes(acrossseasons)significantlycontributetotheperformance(yield)oftomatoes.

Comparisonsofblockeffects

Ho: themeansoftheblockeffectarenotsignificantlydifferent.

H1:themeansoftheblockeffectaresignificantlydifferent.

α=0.05

P–value=0.000

Decision rule: rejectHoifP–value is less than the level of significanceα, otherwise accept.

Conclusion: lookingattheaboveanalysis, P–value which is 0.000islessthanthelevelofsignificanceα=0.05, wedonotacceptHoandconcludethatthemeansoftheblockeffectsaresignificantlydifference.Thatis,theblockeffectofthemeansdonothaveanysignificancecontributionontheperformance(yield)oftomatoes.

**4.2.3POSTHOCTESTFORBLOCKEFFECTSUSINGTUKEYHSD**

Table4.8: MultipleComparisonsofthemeansonblockeffect Dependent Variable: theweightsoftheyieldoftomatoes.

TukeyHSD

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | (I)WEIGHTKINDS | (J)WEIGHTKINDS | Mean Difference  (I-J) | Std.Error | Sig. | 95%ConfidenceInterval | | | Lower Bound | Upper Bound | | ROOTWEIGHT | SHOOTWEIGHT | 9.1197\* | .59074 | .000 | 7.3071 | 10.9322 | | FRUITWEIGHT | 9.8539\* | .59074 | .000 | 8.0413 | 11.6664 | | SHOOTWEIGHT | ROOTWEIGHT | -9.1197\* | .59074 | .000 | -10.9322 | -7.3071 | | FRUITWEIGHT | .7342 | .59074 | .474 | -1.0783 | 2.5467 | | FRUITWEIGHT | ROOTWEIGHT | -9.8539\* | .59074 | .000 | -11.6664 | -8.0413 | | SHOOTWEIGHT | -.7342 | .59074 | .474 | -2.5467 | 1.0783 | |

Table4.8showstheposthocanalysisofthemeansofblockeffecttoknowwhichofthemeanweightmakestheanalysissignificantlydifferent.Lookingattheaboveanalysis,theP–value(shootweights–fruitweights) which is 0.474 is greaterthanthelevel ofsignificanceα=0.05, then, the mean effectofshootweights–fruitweightsarenot significantly differentwhilethe othermeanweights (rootweights–shootweightsandrootweights–fruitweights) aresignificantlydifferent.

**5.1SUMMARY**

ThisprojectworkexaminedtheimpactandvariabilityofclimaticeffectontheyieldoftomatoesinNigeria.Thespecificobjectivesaretodeterminethemonthlymeanweatherrecordedfromthemeteorologicalunit,FUTAfor2019and2021.Also,toevaluatethemultiplecorrelationbetweentheweatherparameterswithrespecttothetomatoesvarietiesandlastly,analyzedtheimpactandvariabilityofvarietiesoftomatoesontomatoesyieldinNigeria.

**5.2CONCLUSION**

ThisresearchstudywasundertakenwithpriormotiveofknowingtheimpactandvariabilityofclimaticeffectontheperformanceoftomatoesinNigeria.Multiplecorrelationwascarriedoutonmonthlydatabetweentheclimaticfactorsconsideredinthisresearchworktoknowtheirimpactontomatoesyield.Foryear2019,itcanbededucedthat,thecorrelationsbetweentheclimaticfactorsarepositiveandstatisticallysignificantat5%level.ThecombinationsofRAINanyotherclimaticfactorsdonotreallyhaveeffectontheproductionoftomatoesinNigeriawhileotherfactorscombinationinfluencestheproductionoftomatoesinNigeriapositively.Alsoinyear2021,basedontheclimaticfactorscombinationsTMEAN&TMIN,TMEAN&TMAX,RAIN&TMIN,RH&RAINandWD&RHarestrongpositive,whichindicatespositiveinfluenceontheyieldoftomatoesinNigeriawhilethecorrelationbetweentheclimaticfactorsTMEAN&RHandTMAX&RHhasanegativeinfluenceontheproductionoftomatoesinNigeria.Analysisofvariancewasconductedonfootweight,rootweightandshootweightagainstwithrespecttothefour(4)varietiesoftomatoesinthisresearchstudy.Itwasdeducedthat,thetreatmentmeansarenotsignificantlydifferent,whichsimplymeans,thevarietiesofthetomatoes(acrossseason)positivelycontributetothegrowthofthetomatoeswhichhelpsinproductionoftomatoesinNigeria.

**5.3RECOMMENDATION**

Thispaperrecommendsthat, thefarmershouldtaketheweatherfactorsveryimportantasitisanimportantinfluenceonthegrowth(yield)oftomatoesinNigeria.

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