

# Study of Variation of Mandi Fee Collection in Various Divisions of Rajasthan APMC

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## Abstract

Agriculture in Rajasthan continues to be the backbone of the state's economy with agriculture & allied sectors contributing 25.56% of state's total GSDP in 2019-20. Agriculture has two main components i.e., production of yield and marketing of yield and in marketing mandi fee plays a vital role as it is the fee paid under the Rajasthan State Agriculture Produce Market Act, 1961. In this paper, we are applying ANOVA to study the variation of Mandi Fee collection in various divisions of Rajasthan APMC. In this sequence we are using some post-hoc tests, as the assumptions of ANOVA are violated here, we are using Welch's Test to find out the value of adjusted F-Statistics further for pairwise comparison of mandi fee of divisions in Rajasthan we are using Games-Howell's Test. In this research we find out that 14 out of 45 pairs have significantly different means of total mandi fee collection of divisions of Rajasthan. So, we conclude that mandi fee differ significantly among the divisions of Rajasthan.

**Keywords:** Mandi Fee, ANOVA, Welch's Test, Games-Howell's Test.

## Introduction

"As when there is fertility of agriculture, till then all the business flourish, but when the soil is left sterile, then consequently all the business nearly dies" – Socrates. Agriculture in India, since ages was practiced earlier on a survival basis as the villagers were self-sufficient, people exchanged their goods and services with the associated village men on a barter basis. Gradually with the progress of means of communication, transport and storage amenities, agriculture has assumed its position as money and profit-oriented business. Markets and marketing of yield is considered as an vital part of agriculture, as individuals, organizations and agriculturally based research institutes are encouraged to make more investment in the technology to upsurge agricultural production. The agricultural marketing includes two words Agriculture and Marketing. Agriculture means activities intended to the use of natural resources for the self-consumption and human welfare. Marketing means a series of activities involved in moving the goods from the place of production to the place of consumption. Marketing acts as a bond joining the producers to the consumers..

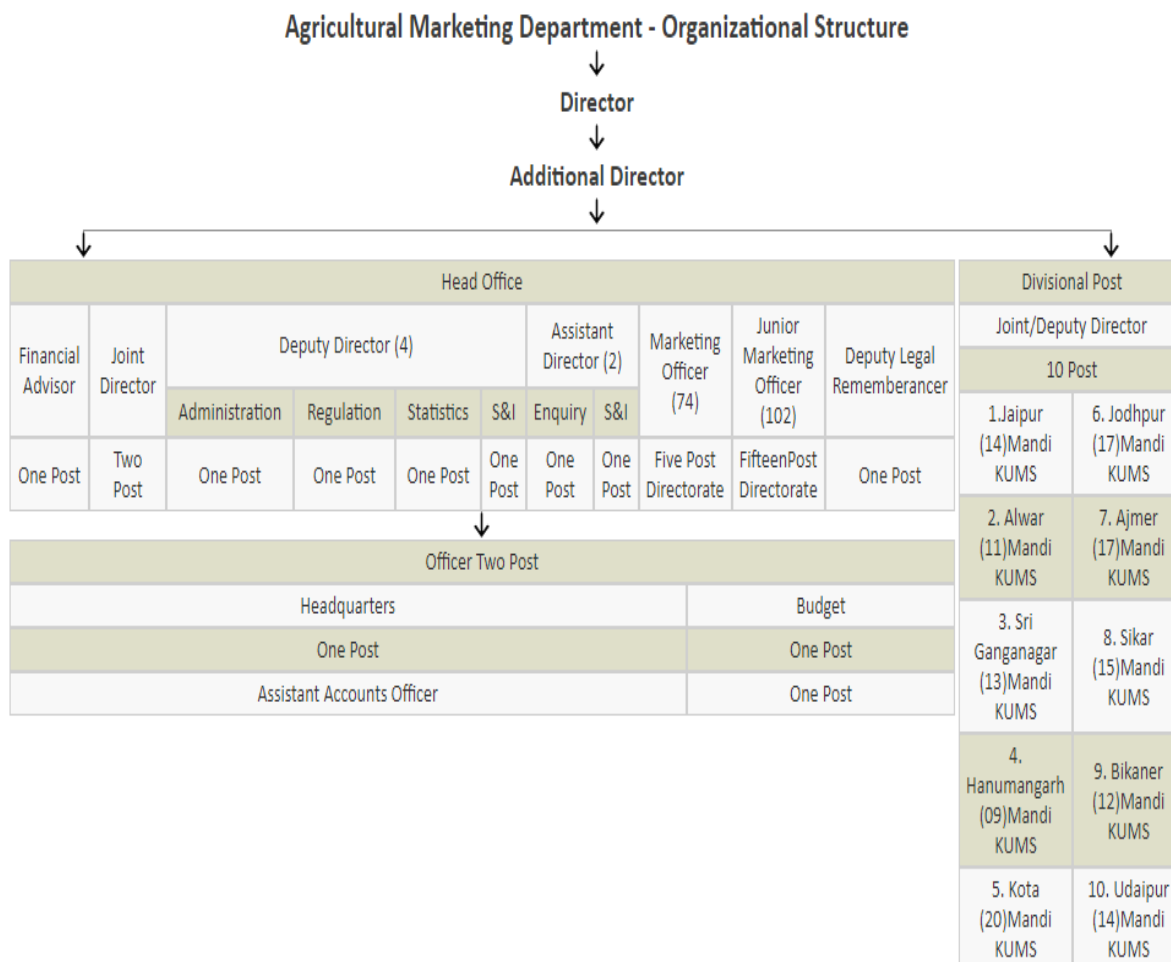
Rajasthan is the largest state of India (3,42,239 sq. km.) situated in the north-western part of the Indian Union. It is largely an arid state for most of its part. The Tropic of Cancer passes through Banswara and Dungarpur districts. The state has a maximum length of 869 km from west to east and 826 km from north to south. The western borderline of the state is part of the Indo-pak international boundary. It touches four main districts of region, namely, Barmer, Jaisalmer, Bikaner and Ganganagar. The state is surrounded by Punjab and Haryana states in the north, Uttar Pradesh in the east, Madhya Pradesh in the southeast and Gujarat in the southwest.

The Visualization of the Department of Agricultural Marketing is to settle agricultural markets in the state and regulate buying and selling procedure of agricultural commodities. The Department warrants competitive value to the farming community who are left behind in the competitive marketing setup. Regulated markets in India are managed by Agriculture Produce Market Commodities. In the agriculture marketing of Rajasthan, there are 10 divisions and 143 main mandi's. These mandi's corresponds to the divisions of Rajasthan. There are 5 market class of mandi and 143 main mandi's are classified into these 5 market classes.

"Super" Class with Annual Income from Mandi Fee Rs. 500 Lacs or more and there are 27 such mandi. "A" Class with Annual Income from Mandi Fee Rs. 350 Lacs or more but less than 500 Lacs with 22 mandi. "B" Class with Annual Income from Mandi Fee Rs. 200 Lacs or more but less than 350 Lacs and 30 mandi are there in Rajasthan with "B" class. "C" Class

with Annual Income from Mandi Fee Rs. 75 Lacs or more but less than 200 Lacs corresponds to 43 mandi. "D" Class Less than Rs. 75 Lacs with Annual Income from Mandi Fee and 21 mandi are of "D" class. The data collected for this study is secondary data from various government sources.

#### Agriculture Marketing Department- Organizational Structure



#### Mandi

An Agricultural Produce Market Committee (APMC) is a publicizing board recognized by state governments in India to warrant farmers are protected from exploitation by large retailers, as well as ensuring the 'farm to retail price spread' does not reach extremely high levels. Farmer produces those crops that raise them a superior value, this was much facilitated by the good markets and marketing. To attain competitive value, effective enforcement of existing act and rules and enactment of new technologies remains always in top primacies of the department. APMCs are controlled by states through their adoption of a Agriculture Produce Marketing Regulation (APMR) Act. Until 2020, the first sale of agriculture yield could happen only at the market yards (mandis) of APMCs. Though, after 2020 with the passing of the Farmers' Produce Trade and Commerce (Promotion and Facilitation) Act, which

allowed farmers to sell outside APMC mandis as well as across different states of India.

#### Establishment of Mandi:

1. Formation of 25 focused mandis on the basis of the principle of marketing where there is production.
2. Allocation policy for payment of plot shops in Mandi premises with effect from 25.4.2005.
3. In the first phase, the provision of allotment of land at concessional rate - the plot is non-transferable.
4. Allotment on 99-year lease, right of the roof of the allotted shop plot to the allottee.
5. Provision for change in lease to shops that were rented out earlier.
6. Allotment of second and advance phases DLC of 50: at the rate.
7. Out of the total available retail plots, 30: Provision for reserved tax allocation for SC/ST category and 3: Reservation for restricted persons.

8. Provision for change in lease to shops that were rented out earlier.
9. Provision for increase in the rent payable at the rate of 5: per annum from 1.4.2008, if the lease is not changed to the allotted shop on monthly rent.
10. Provision to provide land for cold storage, agriculture-based industrial unit, petrol pump and large-agriculture commercial showroom.
11. Provision for disposal of commercial plots on the boundary wall of the market by auction for the business of non-publicized agricultural commodities.
12. There is a provision to change the cost of the land in the construction cost by including 25% of the DLC rate effective on 1.4.2007, if the lease is changed to the allotted shop on monthly rent.
13. Out of shop plots available in market yards, 20: shops reserved for allotment for women farmers, 30 of these: Provision for allocation of plots for women belonging to scheduled caste tribes. Out of the above reserved shops plots, 5 percent shop plots can be allotted by being reserved for widow women farmers.
14. DLC through lottery process in commodity specific market premises. Provision for allotment of plots at the rate of 50:25 out of the total available plots: Provision for allocation of plots reserved for exporters of agricultural commodities, traders from outside the state, industrial units of specific commodity prices and direct exporters of products.
15. DLC plots for purchase, sale, co-operative societies and shop-warehouse to village service cooperative societies. At the rate of 25 percent of the rate and the allocation of the constructed shop godown, the rate at which the first phase was allotted in the respective market committee. Allotment will be done at that rate.
16. Approval has been given to make available 400 square squares of land free of cost in market committees, secondary market yards, for soil testing laboratories and farmers service centres, offices and other buildings of similar nature.
17. Soil testing laboratory in Mandi premises is not operated by Agriculture Department, 15' x 20' plot will be allotted free of cost for setting up of oil testing lab in cooperative sector in those market yards. Oil testing of agricultural produce of farmers will be done free of cost. The test fee up to Rs 30 per sample will be reimbursed to the said Cooperative Oil Testing Lab monthly for the tests done by them by the concerned Agricultural Produce Market Committee to the concerned cooperative institution.
18. DLC to Rajasthan State Seed Corporation and Rajasthan State Seed and Organic Products Certification Society in Mandi premises. The plot will be allotted at the rate.

In the agriculture marketing of Rajasthan, there are 10 divisions and 143 main mandis. These mandis corresponds to the divisions of Rajasthan. There are 5 market class of mandi and 143 main mandis are classified into these 5 market classes. "Super" Class with Annual Income from Mandi Fee

Rs. 500 Lacs or more and there are 27 such mandis. "A" Class with Annual Income from Mandi Fee Rs. 350 Lacs or more but less than 500 Lacs with 22 mandis. "B" Class with Annual Income from Mandi Fee Rs. 200 Lacs or more but less than 350 Lacs and 30 mandis are there in Rajasthan with "B" class. "C" Class with Annual Income from Mandi Fee Rs. 75 Lacs or more but less than 200 Lacs corresponds to 43 mandis. "D" Class Less than Rs. 75 Lacs with Annual Income from Mandi Fee and 21 mandis are of "D" class. The data collected for this study is secondary data from various government sources. Mandi fee means the fee being imposed and paid under the Rajasthan State Agriculture Produce Market Act, 1961.

#### **Exemption from Mandi Fee:**

A Suitable Manufacturing Enterprise other than the enterprises added to the scheme and the enterprises involved in manufacturing of cattle feed/ poultry feed/ fish feed shall be approved exclusion from payment of 50 % of Mandi Fee for 7 years.

Exclusion in cases of expansion and restoration of sick industrial enterprises, Mandi fee shall be permitted only on the supplementary volume of turnover or supplementary consumption of electricity, as the instance may be, achieved/ made by the enterprise after extension or restoration of the sick industrial enterprise, as the instance may be, over and above the maximum annual turnover / maximum annual consumption of electricity, in any of the 3 years instantly prior to the year of the beginning of commercial production/operation or restoration of sick industrial enterprise, as the instance may be, on which such tax/ duty/ fee was allocated and has been deposited (unless exempted under RIPS-2003 or RIPS-2010 or under this Scheme) into the Government exchequer. This exception in any year shall be permissible only after achievement of the maximum annual turnover or maximum annual consumption of electricity, as the instance may be, of the 3 years instantly prior to the year of the commencement of commercial production/operation or restoration of sick industrial enterprise, as the instance may be, in that year.

The enterprises making new investment or investment for expansion or for restoration of sick industrial enterprise under the Scheme, for availing of exception from payment of Mandi Fee, under the Scheme, shall submit duly accomplished application in Form-I, appended to the Scheme, to the Member Secretary of the suitable Screening Committee as soon as possible and not later than the expiry of 90 days of the instigation of commercial production/operation in case applying for benefit of exception from payment of entry tax and within 90 days of the instigation of commercial production/operation in other cases.

#### **Some Government Schemes:**

RAJEEV GANDHI KRASHAK SATHI SAHAYTA YOJANA gives monetary assistance of Rs. Two lakhs to the farmer in case of death of farmer by accident during agriculture procedure.

Agmark grading is undertaken through 8 AGMARK laboratories to guard the consumers from the ill

effects of contamination. Agmark Grading Laboratories are involved in grading the notified food products like vegetable oils, ghee, butter, honey, wheat flour, besan flour, ground spices etc. Test oil percent in Mustard ten oil testing laboratories are in process under various APMCs.

To guarantee easy stay of farmers, KISHAN BHAWAN at 7 divisional headquarters and 26 at district headquarters are in action. Scheme for establishment of Agri trade Towers to deliver office space for purchaser of Agriculture yield has been started in Sriganaganagar, Kota, Khairthal and Jaipur. Aim of the scheme is to warrant improved level of competition for purchase of agriculture yield.

To minimize post-harvest sufferers of agricultural yield, particularly fruits and vegetables, 4 big pack house, 5 small pack houses and 7 cold storages are in action through RSAMB and APMCs. 97 units of cold storage, warehouses, grading and sorting, dehydration, cattle feed etc. are in operation under AGRI PROCESSING AND AGRI BUSINESS POLICY 2010.

#### Review of Literature

*Pant & Bajrolia* (2002) had drawn an attention towards the constraints in utilization of infrastructural facilities and problems met by the market functionaries and farmers in Primary Regulated Market of Kuchanamcity of Nagaur District in Rajasthan. The results revealed drawbacks, like shops and Godowns were inadequate; farmers were unaware about existence of the Regulated Market; bad communication with other markets, etc; public convenience was either not working properly or available during office hours only; anomaly in dissemination in the info through Board, etc; and the other problems described by the Hammals were, lack of rest shed facility, internal unsmooth and cracked road, etc.

*Venkatachalam* (2004) aims towards the nature and functions of the markets that are regulated by the Government. The study is limited to the Erode District of Tamil Nadu. By the help of a Case Study of Avalpoonduari regulated markets, the researcher finds out the problems and prospects of that region, benefits accrued to the farmers and traders, the markets intermediaries and its characteristics. Finally, the researcher concluded that the regulated agricultural produce markets are an effective tool to increase the socio-economic status of the farmers.

*Singh & Dhaka* (2006) study, the quantum and arrival shares of the agricultural produce in the rural markets of Rajasthan. The study pertains to the year 2005-06. The results of the study revealed that out of the total marketed surplus of Cereals of 43.07% was bought and sold in the rural markets of the State and the remaining was sold in the urban markets. For Pulses, 62.32% were sold in rural markets; for Oilseeds 58.16% were sold in the rural markets; and for Spices 36.38% were sold in the rural markets. The study also shows commodities names with the maximum and minimum % of commodities share of arrivals.

*Chadha & Elumalai* (2008) describe regulatory framework of Indian agricultural produce market. As per the outcome it laid emphasis on the

role played by the FCI and State Agricultural Marketing Board in procurement, distribution in reforming the domestic market regulation. A progress report on the production of various agricultural commodities and reforms of agricultural produce markets is also presented.

*Kerur, Gaddi & Kulkarni* (2009) work was undertaken in selected regulated markets of Karnataka for the purpose of to elicit opinions from the farmers and traders about the performance and policy reforms of regulated markets. The performance of the regulated markets as ponders by the traders that, charges fixed for weighing, market fee, and market info through display on the Notice Board and payment of produce over 15 days after the sale are affecting the presentation of the markets.

#### Aim of Study

Agricultural Marketing infrastructure plays a essential role in development and sustaining the tempo for economic progress of farmers. The objectives of mandi fee are to deliver reasonable and competitive price to the farmers for their yield, to free the farmers from unlawful deductions, strengthening agrarian marketing substructure, to deliver marketing amenities to the farmers in the market plots, to emphasise on promotion of marketing of definite commodities, to deliver better amenities to the farmers in the plots, fascinating buyers from neighbouring states, strengthening of substructure of such mandis, and advancement of industrial units related to filtering, cleaning, grading, processing and packing. The objective is to study the variation of the total Mandi fee collection in various divisions of Rajasthan as well as the variation of Mandi fee collection in various mandi of every division of Rajasthan.

#### Methods and Data

One way analysis of variance is a procedure to analyse the equality of several means of the sample or groups. This procedure infer weather all means of the comparable groups under consideration are equal or not.

In an ANOVA, there are two kinds of variables.

1. Independent variable that can be manipulated by the researcher.
2. Dependent variable that is the result of manipulating the independent variable.

#### Hypotheses for the one-way ANOVA:

The null hypothesis ( $H_0$ ) is tested the population means in the One-way ANOVA are equal for k samples.

Null Hypothesis:  $H_0: \mu_1 = \mu_2 = \dots = \mu_k$

If null hypothesis retained that means assumptions is met and if the null hypothesis is rejected then the assumption is not met.

The alternative hypothesis ( $H_1$ ) is that at least two group of means differ significantly.

Alternative Hypothesis:  $H_1: \mu_l \neq \mu_m$

Where l and m are two different samples

#### Assumptions underlying the one-way ANOVA

1. The assumption of independence is the randomness of the observations of samples from the populations. The samples drawn from the population must be random and independent i.e.,

one observation should not be related to other observation. According to the null hypothesis the samples come from populations that have the same mean.

2. The assumption of normality says that the population from which the samples are selected should be normal. That means that the dependent variable should be normally distributed in each of the groups.
3. The assumption of homogeneity says the variances of the population distributions are equal i.e., the variances on dependent variable are equal.

These assumptions verify that the population distributions of the groups have same shape, means and variances.

To apply ANOVA, we will check the assumptions of ANOVA. With respect to violated assumption, a statistical procedure is said to be robust and little affected by violating an assumption. The One-way ANOVA is said to be robust with respect to violations of the assumptions, except in the case of unequal variances with unequal sample sizes. That is, the ANOVA can be used when variances are only approximately equal if the number of subjects in each group is equal. Hence, we can still use one way ANOVA.

In the case where one way ANOVA is robust and the null hypothesis is rejected then we use Welch

Statistic for adjusted F Statistic. We conclude the F ratio to be significant if p-value is less than 0.05. If the F ratio is found to be significant with the Welch statistic, an appropriate post hoc test is required. The Games-Howell post hoc test has been used when assumption of homogeneity of variances has been violated. If q-stat is greater than q-crit then we say that the means differ significantly otherwise there is no difference in the means of the corresponding pair. This test is run using excel commands of real statistics software.

Regulated markets in India are managed by Agriculture Produce Market Commodities. In the agriculture marketing of Rajasthan, there are 10 divisions and 143 main mandis. These mandis corresponds to the divisions of Rajasthan. There are 5 market class of mandi and 143 main mandis are classified into these 5 market classes. For our objective the secondary data was collected from Department of Agriculture Marketing, Government of Rajasthan.

#### **Statistical Analysis of Mandi Fee Collection in various divisions of Rajasthan over a period of 1999-2019**

According to the secondary data collected from Department of Agriculture Marketing, Government of Rajasthan, the total and average Mandi fee collection of 10 divisions for 19 years from 1999 to 2019 are shown below in the following table.

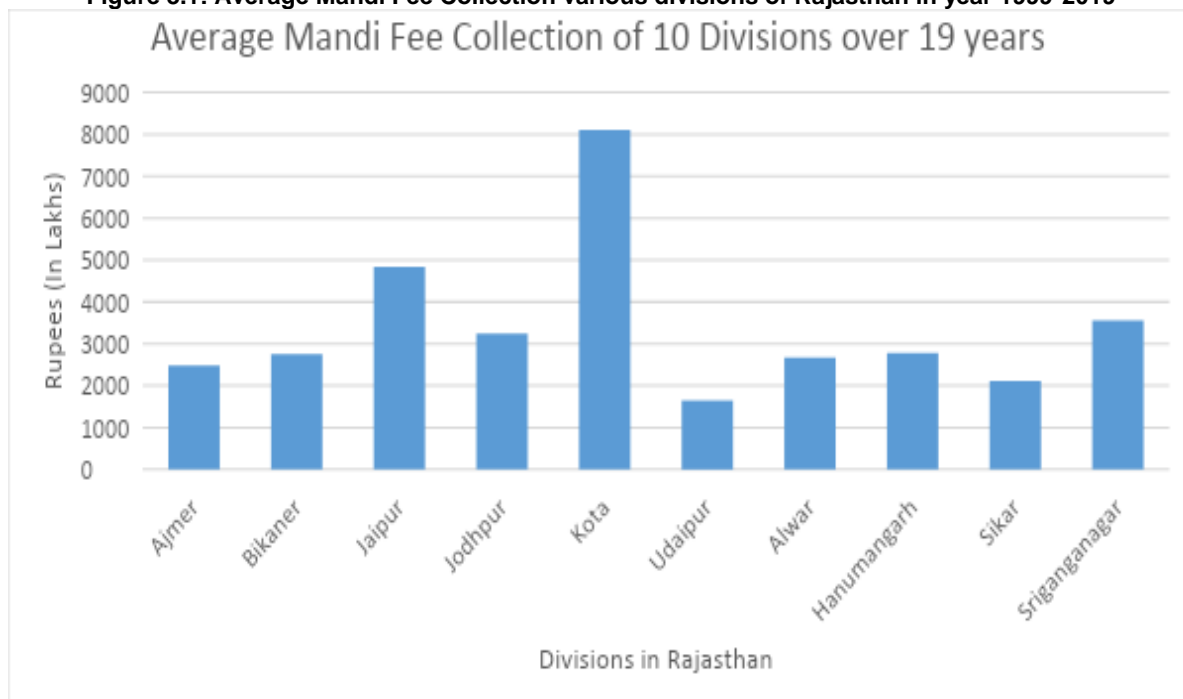
**Table 3.1: Total Mandi Fee Collection of various divisions of Rajasthan in year 1999-2019**

Divisions in Rajasthan	Total Mandi Fee Collection in Year 1999-2019	Average Mandi Fee Collection in Year 1999-2019
Ajmer	47124.66	2480.245
Bikaner	52451.77	2760.619
Jaipur	91802.33	4831.702
Jodhpur	61556.26	3239.803
Kota	153912.6	8100.664
Udaipur	31312.93	1648.049
Alwar	50770.06	2672.108
Hanumangarh	52761.96	2776.945
Sikar	40132.22	2112.222
Sriganganagar	67601.88	3557.994

The graphical representation of average mandi fee collection shows that the maximum average mandi fee collection is from Kota division

which is 8100.664 as given in the above table and the minimum collection is from Udaipur division of 1648.049.

Figure 3.1: Average Mandi Fee Collection various divisions of Rajasthan in year 1999-2019



We apply One-way ANOVA to check the variation of the total mandi fee collection in various divisions of Rajasthan in year 1999-2019. In this case, one way ANOVA is robust as the assumptions of ANOVA are violated and ANOVA is little affected by the assumptions.

**Statistical Analysis**

**Hypothesis**

H<sub>0</sub>: The total mandi fee collection in various divisions of Rajasthan is same.

H<sub>1</sub>: The total mandi fee collection of at least two divisions differs significantly.

Table 3.2: Result of One-Way ANOVA for total mandi fee collection in various Divisions of Rajasthan

ANOVA						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Divisions	590783525.5	9	65642613.94	13.75044	0.00000	1.93221
Within Divisions	859294295.3	180	4773857.19			
Total	1450077821	189				

Hence,  $F_T \sim F(9,180)$  is significant and we reject our null hypothesis at 5% level of significance. We conclude that the total mandi fee collection of at least two divisions differs significantly.

As the null hypothesis is rejected and conclude that the mandi fee collection of at least two divisions differs significantly, as the assumption of homogeneity is violated then we use Welch Statistic for adjusted F Statistic.

Table 3.2: Result of Welch's Test for total mandi fee collection in various Divisions of Rajasthan

Welch's Test	
Alpha	0.05
F Statistics	7.13075
df1	9
df2	72.9775
p-value	0.00000024

As the F ratio is found to be significant with the Welch statistic, we use a post hoc test for pairwise comparison i.e., Games-Howell.

Table A1.1: Result of Games-Howell's Test for pairwise comparison of means of total mandi fee collection of various division of Rajasthan

Comparison	q-stat	q-crit	Result
Ajmer-Bikaner	0.75611	4.788697	Not Significantly Different
Ajmer-Jaipur	5.279991	4.841327	Means Significantly Different
Ajmer-Jodhpur	2.12704	4.780485	Not Significantly Different
Ajmer-Kota	6.931512	4.984127	Means Significantly Different
Ajmer-Udaipur	2.999036	4.786285	Not Significantly Different
Ajmer-Alwar	0.621034	4.764219	Not Significantly Different

Ajmer-Hanumangarh	0.873256	4.771222	Not Significantly Different
Ajmer-Sikar	1.308726	4.781462	Not Significantly Different
Ajmer-Sriganganagar	2.691679	4.809248	Not Significantly Different
Bikaner-Jaipur	4.246374	4.783847	Not Significantly Different
Bikaner-Jodhpur	1.172376	4.765125	Not Significantly Different
Bikaner-Kota	6.396205	4.932332	Means Significantly Different
Bikaner-Udaipur	3.259028	4.845249	Not Significantly Different
Bikaner-Alwar	0.240909	4.792988	Not Significantly Different
Bikaner-Hanumangarh	0.04147	4.770383	Not Significantly Different
Bikaner-Sikar	1.882627	4.837354	Not Significantly Different
Bikaner-Sriganganagar	1.7836	4.768106	Not Significantly Different
Jaipur-Jodhpur	3.334619	4.792827	Not Significantly Different
Jaipur-Kota	3.755054	4.874517	Not Significantly Different
Jaipur-Udaipur	7.559186	4.905385	Means Significantly Different
Jaipur-Alwar	4.880217	4.847177	Means Significantly Different
Jaipur-Hanumangarh	4.422996	4.808213	Not Significantly Different
Jaipur-Sikar	6.419573	4.897496	Means Significantly Different
Jaipur-Sriganganagar	2.494594	4.770699	Not Significantly Different
Jodhpur-Kota	5.864397	4.944214	Means Significantly Different
Jodhpur-Udaipur	4.876224	4.83178	Means Significantly Different
Jodhpur-Alwar	1.605665	4.783966	Not Significantly Different
Jodhpur-Hanumangarh	1.215537	4.766186	Not Significantly Different
Jodhpur-Sikar	3.421069	4.823635	Not Significantly Different
Jodhpur-Sriganganagar	0.730213	4.773379	Not Significantly Different
Kota-Udaipur	8.087799	5.017694	Means Significantly Different
Kota-Alwar	6.707733	4.987953	Means Significantly Different
Kota-Hanumangarh	6.480028	4.959637	Means Significantly Different
Kota-Sikar	7.493776	5.014233	Means Significantly Different
Kota-Sriganganagar	5.354187	4.9081	Means Significantly Different
Udaipur-Alwar	3.752248	4.782702	Not Significantly Different
Udaipur-Hanumangarh	3.672712	4.813315	Not Significantly Different
Udaipur-Sikar	1.925427	4.764403	Not Significantly Different
Udaipur-Sriganganagar	5.116246	4.871528	Means Significantly Different
Alwar-Hanumangarh	0.311976	4.773826	Not Significantly Different
Alwar-Sikar	2.023445	4.778096	Not Significantly Different
Alwar-Sriganganagar	2.23006	4.814394	Not Significantly Different
Hanumangarh-Sikar	2.139191	4.806633	Not Significantly Different
Hanumangarh-Sriganganagar	1.852306	4.783373	Not Significantly Different
Sikar-Sriganganagar	3.844293	4.863003	Not Significantly Different

**Conclusion**

According to the result of Games-Howell test, 14 out of 45 pairs have significantly different means of total mandi fee collection of divisions of Rajasthan that are Ajmer-Jaipur, Ajmer-Kota, Bikaner-Kota, Jaipur-Udaipur, Jaipur-Alwar, Jaipur-Sikar,

Jodhpur-Kota, Jodhpur-Udaipur, Kota-Udaipur, Kota-Alwar, Kota-Hanumangarh, Kota-Sikar, Kota-Sriganganagar, Udaipur-Sriganganagar. And all other 31 pairs of divisions have same mean collection of mandi fee.

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