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Abstracts

The study was assumed in Solapur District of Maharashtra state of India with the objective of estimating Calculation of Correlation Matrix with Milk Production. milk production across Its Variables factors influencing it. The study revealed that variation in output across dairy farmer in the study area was due to difference Variables in their technical efficiency levels. However, it was interesting Variables is Daily Milk, Capacity of Milk cold Storage, Dairy animal in lakh, Per Day Milk Collection, Crossbreed Buffaloes, Deshi Buffaloes, Crossbreed Cows, Deshi Cows, Animal clinics, Total livestock, Co-operative Society, Cold Storage, Artificial Insemination, Total Milk Collection Percentage Literacy, density of population. This affords positive indication that growing the level of commercialization of dairy farms would have beneficial impact on their production efficiency. Correlation Matrix had use significant and positive impact on technical efficiency in the research.

Keyword: - milk production, correlation matrix, Index, variables

Introduction: -

After independence, conscious efforts were made to increase the milk production of our cows. The program has been implemented for the last five decades with mixed breeds of cows such as Holstein Friesian, Brown Swiss, Red Dane, Jersey. This has had a positive effect on milk production. The annual growth rate in the livestock sector is about 5 percent. More efforts are needed to increase milk production by selecting breeds of milch cows and buffaloes in India. Despite the high number of cows and buffaloes in India, the average milk production is very low. The average per capita milk production in the country is 2,070 kg per year, which is less than half the world average. Compared to developed countries, it is only 15 percent. Our good milking cows produce an average of 3000 to 4000 liters of milk per year, which is a good amount for a small breeder; But not enough for a commercial dairy farm.

Sometimes it is necessary to know the relationship between two variables. For instance, a farmer would like to know the effect of irrigation and milk production. If the two are related, he would like to know the nature of relationship and to use that knowledge to his benefits. Correlation techniques mostly use to understand the relationship between two variables. If two variables vary together in the same direction or in opposite directions, they are said to correlate. (Deshpande A.V. and Vaidya M.L, 2006)[1]

Objectives: -

1. To analysis of Milk Production Correlation techniques
2. To analysis of Milk Production variables Index

Methodology:

If as X variable increases, Y increases consistently, we say that X and Y are positively correlated. Sometime some variables are negatively correlated to each other, Where X is increases and Y are decreases. If the change in one variable is proportional to the change in other variables are said to be perfect correlation. Correlation can be found out by four major methods like Scatter diagram, Correlation table, Correlation graph and Coefficient of correlation.

Karl Pearson's Coefficient of correlation method is used to find out correlation of various

variables to the milk production of Solapur District. The coefficient of correlation represented by r and named after Karl Pearson.

The value of "r" lies between (-1 and +1)

If $0 < r < 1$ mean the correlation is positive

If $r = 1$, mean the correlation is perfect positive

If $-1 < r < 0$ mean the correlation is negative

If $r = -1$, mean the correlation is perfect negative

And if, there is no correlation between two variable $r = 0$

Thus, only four indices are used in this analysis. For establish correlation of thirteen variables were carefully chosen.

The chosen variables are as below:

X_1:- Daily Milk production,('000' liters)

X_2: Capacity of Milk cold Storage

X_3: Dairy animal in lakh

X_4: Per Day Milk Collection '000'Lit

X_5: Crossbreed Buffaloes

X_6: Deshi Buffaloes

X_7: Crossbreed Cows

X_8: Deshi Cows

X_9: Animal clinics

X_{10}: Total livestock

X_{11}:Co-operative Society

X_{12}: Cold Storage

X_{13}:-Artificial Insemination

X_{14}: Total Milk Collection (000lit.)

X_{15}: Percentage Literacy

X_{16}:- density of population

The reason for selection of above variables was strengthening the result of hypothesis that Maximum number of farmers of irrigated area practice dairy farming. And there is relationship between dairy farming and types of dairy cattle. Selection of fodder crop as a variable is of vital importance since it represents an essential element for the development of dairy farming. Therefore, positive correlation is expected between irrigated land and milk production, as well as dairy animal Variable X_3 i.e. Dairy animals plays a prominent role in development of dairy farming. They are the main source of milk production in the study area. In normal circumstances, it would be logical to assume that larger the number of dairy cattle more shall be the milk production.

Table No.1, correlation matrix data of secondary data. (2018)

Sr. No	Tahsil	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14	X15	X16
1	North Solapur	2786	120	61196	06	5032	4767	2786	4454	5	61196	103	3	5032	2434	82.07	186
2	South Solapur	3156	30	99518	06	5237	9142	2527	9850	5	99518	98	1	5237	2339	73.42	218
3	Mohol	2931	30	159875	13	33180	8443	20428	1154	9	159875	262	1	33180	5000	75.77	196
4	Barshi	2633	130	145153	07	19300	19272	10285	10917	9	145153	331	3	19300	2690	78.93	175
5	Madha	2603	100	206887	16	57077	11650	32558	14812	5	206887	555	2	57077	6168	77.12	196
6	Sangola	4517	100	357860	70	53777	11531	34816	29577	9	357860	524	2	53777	25820	72.89	194
7	Pandharpur	4358	50	254161	38	42717	8758	26476	17830	7	254161	410	2	42717	13961	77.68	267
8	Mangalwedha	4772	30	168227	61.	24487	6997	15516	13905	5	168227	404	2	24487	22316	72.25	161
9	Malshiras	24090	200	363436	157	66260	11340	41659	22837	12	363436	266	4	66260	57396	76.63	286
10	Akkalkot	667	0	112993	02	1732	15186	902	11870	8	112993	67	0	1732	744	69.63	181
11	Karmala	4970	60	162015	18	31657	16603	1913	10898	9	162015	475	2	31657	6584	75.52	144

(X1:- Daily Milk production,('000'liters),X2: Capacity of Milk cold Storage,X3: Dairy animal in lakh,X4: Per Day Milk Collection '000'Lit,X5: Crossbreed Buffaloes,X6: Deshi Buffaloes,X7: Crossbreed Cows,X8: Deshi Cows,X9: Animal clinics,X10: Total livestock Percent,X11:Co-operative Society,X12:Cold Storage,X13:-Artificial Insemination,X14:Total Milk Collection (000li.),X15: Percentage Literacy,X16:- density of population)

Table No.2, Correlation Matrix Variable Index (For the Entire Solapur District, based on Secondary data-2018)

Variable	X1	X2	X3	X4	X5	X6	X7	X8	X9	X10	X11	X12	X13	X14	X15	X16
X1	1															
X2	0.690	1														
X3	1	0.690	1													
X4	0.999	0.689	0.999	1												
X5	0.753	0.456	0.754	0.754	1											
X6	-0.048	-0.050	-0.048	-0.051	-0.101	1										

X7	0.939	0.591	0.939	0.940	0.876	-0.073	1									
X8	0.501	0.071	0.501	0.500	0.333	0.323	0.518	1								
X9	0.749	0.341	0.749	0.747	0.401	0.103	0.609	0.375	1							
X10	0.889	0.568	0.889	0.889	0.732	0.027	0.882	0.687	0.687	1						
X11	0.519	0.342	0.519	0.520	0.759	0.038	0.678	0.2630	0.257	0.58303	1					
X12	0.646	0.918	0.646	0.645	0.3179	-0.149	0.546	0.0531	0.355	0.46379	0.3554	1				
X13	0.810	0.540	0.810	0.811	0.9211	-0.133	0.932	0.4348	0.4565	0.8567	0.8509	0.471	1			
X14	0.942	0.611	0.942	0.942	0.6084	-0.201	0.829	0.477	0.797	0.8543	0.3732	0.600	0.7006	1		
X15	0.077	0.596	0.077	0.077	-0.002	-0.150	0.124	-0.185	-0.185	-0.026	0.092	0.681	0.109	-0.061	1	
X16	0.634	0.408	0.634	0.636	0.395	-0.062	0.644	0.703	0.703	0.6503	.065	0.336	0.478	0.598	0.185	1

(Source- Compiled by researcher)

District Level Correlation Analysis:

As mentioned earlier, the secondary data obtained from the Solapur District Dairy Development Officer, District Socio-economic Statistical review, was arranged in form of a 1 x 16 data matrix. This data was subjected to Pearson's product moment coefficient of correlation. Student's' test has been applied to determine significant 'r' values at 0.05 and 0.01 percent level of implication. The results obtained (Table No.1 and 2) show certain significant associations among the various selected variables, which are described as follow;

X1. Daily Milk production, ('000' liters):

Table 6.6 shows that variables X1, X3, X4, X7, X10, X13, X5, and X14, show it are positive correlation with Daily milk production. the important characteristics of dairy farmers related to the dairy activity.

X6, Deshi Buffaloes (r= -0.048) is perfect negative significantly correlated to with Daily Milk production, (000 liters). Perfect medium positive significantly correlated X5 hybrid cows in percentage (r=0.753), X9 Animal clinics (r =0.749), and density of population X16(r= 0.634).

X2. Capacity of Milk Cold Storage:

This index exhibits positive correlation with number of Cold Storage (r = 0.918), X3Dairy animal in lakh (r= 0.690), X4 Per Day Milk Collection '000'Lit (r = 0.689) and X14 Total Milk Collection (000li.), (r=0.611) and X15 Percentage Literacy (r=0.596). X5 (r=0.570), X10, Total livestock Percent (r=0.568) Co-operative Society X11 (r=0.342). X6 Deshi Buffaloes (r=0.050) though it's negative correlation with number of animals. There is essential for farmer to know the supervision of herd; cattle feed, morphology of cow stable, marketing system, and basic and timely veterinary facilities for development of dairy farming.

X3. Dairy animal in lakh: -

This Dairy animal index is highly positively correlated with X4 Per Day Milk Collection '000'Lit (r = 0.999), and X7 Crossbreed Cows, (r=0.939), X10 Total livestock Percent, (r=0.889), and X14Artificial Insemination (r=0.942), However, Negative but comparatively less significant correlation is seen with X6, Deshi Buffaloes (r= -0.048), since, proportion of illiterate farmers is similar in both regions.

X4. Per Day Milk Collection '000'Lit:-

Per Day Milk Collection is positively correlated with X7 Crossbreed Cows (r = 0.940). X14, Total Milk Collection (000li.) (r=0.942), X10 Total livestock Percent (r=0.889) X13 Artificial Insemination (r= 0.811) Per Day Milk Collection increased to daily milk collection observed that, the milk contributed a much larger proportion of the total income of the cow keeping landless laborer in a dairy village than in control villages. Large land holding farmers have more cows as compare to the small land farmers. In strong negative correction Per Day Milk Collection with X6, Deshi Buffaloes (r= -0.005).

X5. Crossbreed Buffaloes:-

The positively correlated Crossbreed Buffaloes with X13Artificial Insemination (r=0.921) and Total Milk Collection (000lit.) (r = 0.815) Crossbreed Cows (r= 0.876) since, X10, Total livestock Percent (r=0.732). X6 Deshi Buffaloes (r= -0.101) and Literacy Percentage (r= -0.002) it is negative correlation.

X6. Deshi Buffaloes: -

The co-efficient of medium positive correlation between populations of X8 Deshi Cows (r=0.323), and X9 Animal clinics (r=0.103). To negative correlation with Deshi Buffaloes X7 Crossbreed Cows (r= -0.073), X12 Cold Storage (r=-0.149), X13 Artificial Insemination (r= -0.133), X14 Total Milk Collection (000li.) (r=-0.201), X15 Percentage Literacy, (r=-0.150) and X16 Density of Population (r= -0.062).

X7. Crossbreed Cows: -

The population of Cross-breeding the co-efficient of positive correlation between X13 Artificial Insemination (r=0.932), X10, Total livestock (r= 0.882) and X14 Total Milk Collection

(000lit.) (r=0.829). Crossbreed cows X15 Percentage Literacy (r=0.124) and X16 Density of population (r= 0.644).

X8. Deshi Cows: -

To the co-efficient of medium positive correlation between population of Deshi X10 Total livestock (r= 0.687), Cows X13 Artificial Insemination (r= 0.434) and since, There is a caveat, though. This can also be since of high yield rate (milk per cow). X15-Percentage Literacy (r= -0.185) and X16- Density of population (r= -0.703).

X9. Animal Clinics: -

To the co-efficient of positive correlation between X14-Total Milk Collections (000lit.), (r= 0.792) and X10 Total livestock (r= 0.687), X16- Density of population (r= 0.703). This can also be since of high yield rate (milk per cow). Negative correlation X15-Percentage Literacy (r= -0.185).

X10. Total livestock: -

To the co-efficient of positive correlation between with X14-Total Milk Collection (000lit.),(r=0.901) and X13 Artificial Insemination(r=0.792). X15-Percentage Literacy (r= -0.160) and X16- Density of population (r= -0.267).

X11. Co-operative Society: -

To the co-efficient of positive correlation between with Co-operative Society X13-Artificial Insemination (r=0.805) and X14 Total Milk Collection (000lit.), (r=0.505). To the co-efficient of negative correlation between with Co-operative Society with X15 Percentage Literacy (r= -0. 187) and X16- Density of population (r= -0.449).

X12. Milk Collection of Cold Storage: -

To the co-efficient of positive correlation between with Cold Storage X13-Artificial Insemination (r=0.487) and X14-Total Milk Collection (000lit.), (r=0.626). To the co-efficient of positive correlation between with Co-operative Society with X16- Density of population (r= 0.359) and X15 Percentage Literacy (r=0.611).

X13. Artificial Insemination: -

To the co-efficient of positive correlation between with Cold Storage X13-Artificial Insemination and X14-Total Milk Collection (000lit.), (r=0.743). To the co-efficient of negative correlation between with X15 Percentage Literacy (r=-0.083) and X16- Density of population (r= -0.279).

X14. Total Milk Collection (000lit.): -

To the co-efficient of negative correlation between with Total Milk Collection (000lit.), X15-Percentage Literacy (r= -0.130). To the co-efficient of negative correlation between with X16-Density of population (r= -0.191).

X15. Percentage Literacy: -

To the co-efficient of positive correlation between with Percentage Literacy, X15- Percentage Literacy (r=1). To the co-efficient of negative correlation between with X16- Density of population (r= -0.130).

X16. Density of Population: -

To the co-efficient of positive correlation between with Density of population, X16-Percentage Literacy (r=1).

Conclusion: -

This paper Calculation of Correlation Matrix with Milk Production the possibility of using different variables data available to a wide range of dairy milk. Per Day Milk Collection increased to daily milk collection observed that, the milk contributed a much larger proportion of the total income of the cow keeping landless laborer in a dairy village than in control villages. Large land holding farmers have more cows as compare to the small land farmers. In strong negative correction Per Day Milk Collection with Deshi Buffaloes. There is need for farmer to know the management of herd; cattle feed, morphology of cow stable, marketing system, and basic and timely veterinary facilities

for development of dairy farming.

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