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## Statistical analysis for animal husbandry

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### Abstract

Cattle and poultry farms are used for earning income and getting employment opportunities. Poultry farms business have benefits like less capital, needs less space, high returns in short period of time, huge global demand, easy marketing etc., Major species of animal husbandry and dairying are cattle, buffalo, sheep, goat, pig, mithun, yak, horse, pony, mule, donkey and camel. In this paper we are calculated compound and linear growth rates for animal husbandry and explained based on cluster analysis.

**Keywords:** Cattle, poultry forms, growth rates, culture analysis

### Introduction

Many human beings in India mainly farmers not only depending on agriculture but also animal husbandry for their livelihood. For the purpose of milk and milk products like curd, cheese, butter, ghee etc. not only these but also meat, eggs, wool etc. Major source of power for both agriculture and dairy farmers are animal husbandry like bulls. Animal husbandry plays important roles in rural economy. Gert Jan Manteny *et al.* [1] gave an article on a review is presented for the agriculture related sources of methane and nitrous oxide and main strategies for mitigation. The rumen is the most important source of methane production, especially in cattle husbandry. Less, but still substantial, amount of methane are produced from cattle manures. The main sources of nitrous oxide are comprise a source approach i.e. changing animal diets towards greater efficiencies. Dobbie and Smith [2] published a research article on impact of different forms of N fertilizer on N<sub>2</sub>O omissions from intensive grass land. Mills *et al.* [3] explains about a mechanistic model of whole tract digestion and methanogenesis in the lactating cow: model developed, evaluation and application. Yangiang Wei *et al.* [4] in their research article they discussed animal husbandry in Qinghai – Tibetan Plateau is the third largest snow covered area in China and is one of the main snow disaster regions in the world. It is thus imperative to urgently address the issue of vulnerability of the animal husbandry sector to snow disasters as a result of future climate change. Lun Yang *et al.* [5] in their article, there are three main objectives of paper and are 1. Paper highlights the influences of traditional culture and information technology on livelihood capital accounting frame work for agricultural heritage systems. Second part is planting decisions of households into planting structures demonstrated in phase the current and planting willingness. Objective 3 is select demonstrated on anticipated phase. The SVR model and the probit model to screen livelihood capital indicators obviously relevant to planting decisions. Based on statistical analysis, this paper makes element analyses of livelihood capital indicators with an obvious relevance one by one and finally screens incentive, restrictive and regulatory livelihood capital indicators influencing planting decisions of household.

### Methodology

For computation what is the growth animal husbandry like Cattle, Buffalo, Sheep, Goat, Pig, Mithun, Yak, Horse, Pony, Mule, Donkey and Camel etc. by using linear growth rate and compound growth rate.

### Linear growth rate

Linear growth begins with an initial population called P<sub>0</sub>. In each time period or generation, the population changes by a constant amount called the common differenced. The basic model is

$$P(f) = P_0 + t_d$$

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In general, we estimate linear growth rate by using formulae

$$\text{Linear growth rate} = \frac{\text{initial value} - \text{past value}}{\text{Past value}} \text{ in percentage}$$

**Initial value is present year value and past value means other than present year, before present year value**

**Step-1:** Enter data of present and past years with animal husbandry names in column 1, 2 & 3.

**Step-2:** Place cursor in D1 and in D, types linear growth rate as heading.

**Step-3:** Type formula in D2 and drags for all other remaining cells.

**Compound growth rate**

Compound growth rate or Compound Annual Growth Rate (CAGR) steps to calculate in excel is

1. The RRI function calculates CAGR of the animals husbandry.
2. The CAGR measures the growth of an investment as it had growth at a steady rate on an annually compounded basis.
3. We can easily create a CAGR formula that calculates compound annual growth rate of an investment in excel is

$$CAGR = \left( \frac{\text{Present value}}{\text{Previous value}} \right)^{1/2} - 1$$

4. The CAGR formula enter in cell and drag to calculate remaining values.

**Cluster analysis**

Cluster analysis or clustering is the task of grouping a set of objects in such a way that objects in the same group are more similar to each other than to those in other groups. It is a main task of exploratory data analysis, and a common technique for statistical data analysis, used in many fields, including pattern recognition, image analysis, information retrieval, bioinformatics, data compression, computer graphics and machine learning.

**Empirical Investigations**

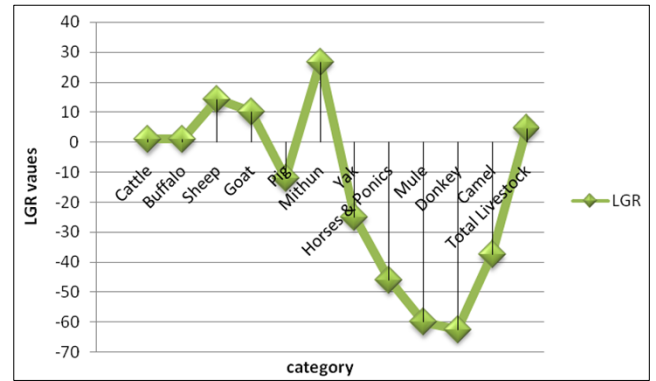
For animal husbandry i.e. cattle, Buffalo, Sheep, Goat, Pig, Mithun, Horse, Pony, Mule, Donkey, Camel and total animal husbandry is as follows:

**Table 1:** Category Population 2012 2019 LGR

Category	Population (In million) 2012	Population (In million) 2019	LGR
Cattle	190.9	192.49	0.832897
Buffalo	108.7	109.85	1.057958
Sheep	65.07	74.26	14.12325
Goat	135.17	148.88	10.14278
Pig	10.29	9.06	-11.9534
Mithun	0.3	0.38	26.66667
Yak	0.08	0.06	-25
Horses & Ponies	0.63	0.34	-46.0317
Mule	0.2	0.08	-60
Donkey	0.32	0.12	-62.5
Camel	0.4	0.25	-37.5
Total Livestock	512.06	535.78	4.63227

There exists a negative growth for pig, yak and horses and ponics Mule, donkey and Camel of -11.95, -25, -46.03, -60, -62.5 and -37.5 respective of where as rest of animals have

positive growth i.e cattle, Buffalo, Sheep, Goat, Mithun, and total animal husbandry

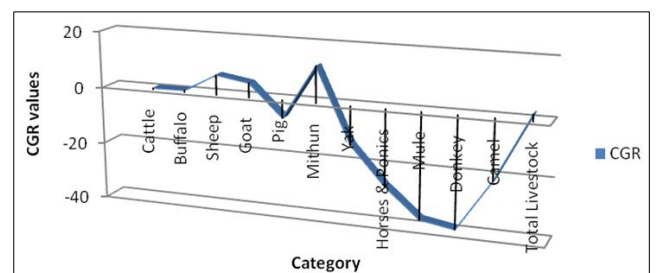


**Fig 1:** By taking category on X-Axis and LGR on Y-axis, we got above graph

There is positive increase cattle, Buffalo, Sheep, Goat and Mithun and negative growth in pig, yak and horses & ponics. Compound growth rate for different categories of animal husbandry for Cattle, Buffalo, Sheep, Goat, Pig, Mithun, Yak and Horses & Ponics is as follows:

**Table 1:** Category Population 2012 2019 CGR

Category	Population (In million) 2012	Population (In million) 2019	CGR
Cattle	190.9	192.49	0.415584848
Buffalo	108.7	109.85	0.5275871
Sheep	65.07	74.26	6.82848491
Goat	135.17	148.88	4.948931944
Pig	10.29	9.06	-6.16682504
Mithun	0.3	0.38	12.54628677
Yak	0.08	0.06	-13.3974596
Horses & Ponics	0.63	0.34	-26.5369113
Mule	0.2	0.08	-36.7544468
Donkey	0.32	0.12	-38.7627564
Camel	0.4	0.25	-20.9430585
Total Livestock	512.06	535.78	2.289916246



**Fig 2:** By taking category on X-Axis and CGR values on Y-Axis we got above graph

K-mean cluster for cattle, Buffalo, Sheep, Goat, Pig, Mithun, Yak, Horses, Ponies, Mule, Donkey, Camel and Total livestock in grouped into clusters I, II and III.

**Cluster-I:** Cattle, Buffalo, Goat

**Cluster-II:** Sheep, Horses and Ponies

**Cluster-III:** Pig, Yak, Mule, Donkey and Camel

**Summary and Conclusions**

For animal husbandry of Cattle, Buffalo, Sheep, Goat, Pig, Mithun, Yak, Horses, Ponies, Mule, Donkey, Camel and Total livestock for linear growth rate and compound growth rates

are calculated. There exists a negative growth for pig, yak and horses and ponies Mule, donkey and Camel of -11.95, -25, -46.03, -60, -62.5 and -37.5 respective of where as rest of animals have positive growth. By using compound growth rate is -6, 16, -12.55, -13.3974, -36.75, -38.76 and -20.94 percent negative growth for pig, yak, horses and ponies, mule, donkey and camel. All animal husbandry items are divided into 3 clusters, they are Cattle, Buffalo, Goat as cluster I, Sheep, Horses and Ponies as cluster II and pig, yak, mule, donkey and camel as cluster III.

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