

## **Trends and Growth in Livestock Population in Sindh: A Comparison of Different Censuses**

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### **ABSTRACT**

Livestock represents an important component of the agricultural sector in Pakistan especially Sindh. Indeed, crop and livestock activities are, to a great extent, interdependent upon each other, for their functioning within the farm sector. The latter provides inputs like farm yard manure (FYM) and draught power for the crop sector and, in turn uses fodder, crop products and residues. The present study has, therefore been undertaken to see the trend and growth rates of cattle, buffaloes, sheep, goats, and camels in Sindh during 1955 to 1996 livestock censuses. The study uses the livestock census data for 1955, 1960, 1972, 1976, 1986, and 1996. The study reveals that the population of cattle, buffaloes, sheep, goats, and camels has become steadily more important in the livestock economy of Sindh during the last two livestock census as compared to other provinces. The two types of livestock that showed relatively high growth rates over the four decades (1955-1996) are goats and sheep; the cattle, camels and buffaloes recorded relatively low growth rates. The highest number of cattle, sheep, goats and camels in Tharparkar are mainly glaring because the valley of Nagarparkar is richer in vegetable growth, which supports these types of livestock. A large number of buffaloes in Hyderabad and Nawabshah are mainly found, because in these two districts there are a large number of big farmers who can afford their farming in order to sell their milk.

**JEL. Classification:** Q12; O13.

**Keywords:** Livestock, Trends, Comparison, Historical, Compound, Growth-rate, Semi-log exponential, Sindh

### **1. INTRODUCTION**

From time immemorial livestock rearing is given much importance not only in developing countries but also in developed countries. In third world countries, where the level of mechanization in agriculture is low, livestock rearing is mainly for draught purpose. On the other hand, the use of animals for draught purpose is low in developed countries owing to high level of farm mechanization and the animals are mainly reared for the consumption of meat and milk.

Livestock represents an important component of the agricultural sector in Pakistan especially Sindh. Indeed, crop and livestock activities are, to a great extent, interdependent upon each other for their functioning within the farm sector. The latter provides inputs like farm yard manure (IFYM) and

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draught power for the crop sector and, in turn uses fodder, crop products and residues. The livestock activities accounted for about 36 percent of the total value of agricultural output and about 9.0 percent of the GDP in the country during the year 1999-2000 (Economic Survey 2000-2001). The contribution of livestock to the national economy takes different forms such as, yielding milk, providing meat and by-products like leather, hide and manure. Its products constitute an important source of foreign exchange earnings. Its net foreign exchange earnings were to the tune of Rs.39.5 billion in 1999-2000. During the year 1999-2000 about 9 percent of total foreign exchange earnings were generated by animal origin products like wool, hides, skins, etc. The role of livestock in rural economy may be realized from the fact that 30-35 million rural population is engaged in livestock raising, having household holdings of 2-3 cattle/buffalo and 5-6 sheep/goat per family deriving 30-40 percent of their income from it. Economic development in the Third World countries largely depends on the ability of the rural poor to increase their disposable incomes. In the present age of rising costs of fuel energy, expanding population and growing realization of the hazards of environmental pollution, livestock can help increase incomes and production over the entire year. It enables farmers in these countries not to be overtaken by mechanization which is becoming increasingly energy-intensive. Instead they can capitalize on other resources, solar energy and under-employed labour, which are abundantly available to them. It is estimated that some 55 percent of all the world's cattle are found in the tropics of the Third world as are 60 percent of the world's buffaloes (mainly in Asia). In countries like Pakistan, 40 to 60 percent of all goods taken to market are transported by animals including camels, donkeys, buffaloes and oxen. In predominantly agricultural countries (like Pakistan), livestock is an insurance against harvest failures and a source of easily cashable investment capital.

The population of cattle, buffaloes, sheep, goats and camels has become steadily more important in the livestock economy of Sindh during the last two livestock census as compared to other provinces (Table 1). In Punjab the population of cattle, buffaloes, sheep and camels decreased in 1996 as compared to 1986. The population of goats increased marginally. In NWFP the population of cattle, sheep, goats and camels increased while that of buffaloes decreased in 1996 as compared to 1986. In Balochistan the population of cattle and camels increased while that of sheep and goats decreased. The population of buffaloes remained the same in 1986 and 1996 livestock census. Livestock population of Sindh, increased more percentage wise, in NWFP and Balochistan. We have chosen the livestock population of Sindh mainly because of two reasons.

- i) Sindh is the major agricultural province after Punjab. The productivity of most of the crops of Sindh is higher as compared to Punjab. The population of cattle, buffaloes, sheep, goats and camels increased by more percentage in 1996 as compared to NWFP and Balochistan.
- ii) Sindh has a larger percentage of small and medium farmers as compared to Punjab. Since majority of the small and medium farmers are poor therefore they kept their own livestock for draught and milk

purposes. Due to small holdings neither they can use machinery nor afford it.

**Table – 1**

**Percentage Distribution of Cattle, Buffaloes, Sheep, Goats and Camels by Province according to 1986 and 1996 Censuses**

Province	Cattle		Buffaloes		Sheep		Goats		Camels	
	1986	1996	1986	1996	1986	1996	1986	1996	1986	1996
Punjab	50	46	71	64	29	26	36	37	34	23
Sindh	22	27	20	28	11	16	23	24	23	28
NWFP	19	21	8	7	9	12	14	16	7	8
Balochistan	7	6	1	1	48	46	24	23	36	41

Source: Pakistan Livestock Census, (1986 and 1996), Agricultural Census Organization, Government of Pakistan.

In spite of the important role of livestock in agriculture and Sindh economy, it has not yet received adequate attention in economic planning of Sindh. It seeks to stimulate the thinking of professional scientists and owners of livestock in the rural areas of Sindh with a view to increase the livestock population and the support provided by this resource to people's livelihood.

**The main objective** of this paper is to see the growth rate of cattle, buffaloes, sheep, goats and camels in Sindh. **The study specifically examines.**

- i) the historical background of cattle, buffaloes, sheep, goats and camels.
- ii) the trends in population and percentage distribution of cattle, buffaloes, sheep, goats and camels during 1955 to 1996 livestock censuses in Sindh.
- iii) the comparison of cattle, buffaloes, sheep, goats and camels in Sindh during 1976-1986 and 1986-1996.
- iv) the annual compound growth rate of livestock in Sindh during two points in time.
- v) the population comparison of cattle, buffaloes, sheep, goats and camels by district in Sindh during 1986 and 1996 census.
- vi) the distribution of sample households keeping cattle, buffaloes, sheep, goats and camels according to the size of their cultivated land holdings in Sindh.

## 2. HISTORICAL BACKGROUND OF LIVESTOCK AND THEIR CHARACTERISTICS

**2.1 A Male Buffaloes:** Till 1964 buffalo was being divided in three types. The Neeli and Ravi type is found in Punjab and Kundhi type in Sindh. But those experts who attend the yearly national exhibition of all India and Pakistan did observe and made a deep study of these types and concluded that differences between Neeli and Ravi are not much important as far as the economic aspect is concerned. They also say that going on selecting the animals on the basis of a little different quality will make the list so long that the whole exercise of selection process will prove to be ineffective.

**Neeli Ravi:** This generation is found in the valleys of River Satluj and Ravi. The first farm of this generation was brought into action in Bahawal Nagar of Okara tehsil in 1936 which was transferred to Quaddabad in 1963. The second farm of such buffaloes was situated in Mianwali in 1951. Beside these the government of Pakistan granted two more farms in Kalabagh of Tehsil Mianwali and Kalera of Sargodha Tehsil in 1960. Mostly these buffaloes are of black colour having a white spot on forehead, white circled silvery eyes, horns, long thin ground touching white tail. The colour of its back legs, from hooves to ankle is white. In the middle of its body it is hefty with raised forehead, long thinner head, sunken eyes, long thin and delicate neck, gradually increasing its weight from the front to back, wide inflexible waist, broad and levelled muscles are the liking qualities of Neeli Ravi. A young buffalo has an average height, length, roundness and weight of the following denomination. Height = 54", Length = 62", Roundness = 89", Weight = 1763 pounds

A buffalo can be used for the following three purposes:-Breeding, Draught purposes and Meat production.

**Breeding:** Those animals that are used for breeding purpose should get the much of food which may not make them fatter or weaker. Therefore it should be noted that they should be given, their diet according to their need. In preparing the mixture of fodder for them precaution should be taken that gravy parts may not be mixed in large quantity.

**Draught Purposes:** The bulls which are used for work purposes are often used when they are castrated, but buffaloes are used without castration. Their diet depends upon the nature of their job.

**Meat Production:** Meat plays important role in the development of human body. Therefore in developed countries special steps are taken to get meat from animals. They have special brands for meat provision. But in Pakistan there is no brand like that. It is therefore needed that we may bring up our animals in that manner that we obtain the required vitaminous meat.

**2.2 Female Buffaloes:** Buffalo is milk providing pet animal. From ages it is brought up for three main purposes i.e. for milk, meat and field cultivation. Its picture on seals found before 2500 B.C. shows that buffalo was nurtured at that time as well. In earlier days buffaloes were used for cultivation purpose but later they were traded as pet animals for milk. According to a

guess seventy percent milk is supplied by buffaloes and the rest thirty percent is through cow.

Pakistani buffaloes are famous for large quantity of milk therefore their demand is found in various countries of the world in which the names of China, Sri Lanka, Myanmar (Burma), Thailand and Philippines are included. Buffalo is an animal of water therefore it likes watery place more than dry land. As such buffaloes are found more in those areas where water is in abundance (for example Sindh) rather where the area is dry. In Sindh canal irrigation system is very good and nearly about 90 percent of irrigation is through canal. The fodder needed by a buffalo is double than a cow therefore it is mostly nourished in canal areas because in those areas not only water but also fodder can be found in plenty. Nourishing a buffalo in a dry and cold area is a difficult job but a cow can be more fruitful in such climate.

Generally the sexual emotionalism called as heating appears after twenty one days in buffaloes and remains for ten to thirty six hours. The desire for sex remains suspended from the time of pregnancy till the end of the issue. After three weeks of the birth buffalo again heats up. To find out sexual emotionalism in a female buffalo is difficult without the presence of a male buffalo.

**2.3 Sheep:** Sheep is a tame animal which provides milk, meat and wool. It is called as animal of golden hoof. From the study of human culture it appears that man started cattle breeding from sheep. During this period Man was selecting such sheep which was least unruly. With continuous companionship of men with properly selected sheep, the sheep have lost their freedom so much that they have completely forgotten their self reliance. This is the reason that sheep never leaves its herd and wherever a sheep goes remaining sheep follow. If you like that sheep should go on an unknown path then get a person to walk on that path in front of them and all sheep will follow them. It almost never gives birth to twins. The lambs are usually sold at the age of 4 to 6 months for slaughter. The wool is rather rough, and has traditionally been woven into blankets. There are two shearing of sheep during the year, in summer and in winter. The average weight of wool per shearing was found to be 320 grams per ram and whether, 250 grams per ewe, and 180 grams per lamb, the annual production per animal being double of these figures. Besides the sale of lambs and the culled adults, and of the wool, a third important source of earning from sheep is folding the flock on farmer's lands, since the droppings are valued as rich organic manure.

**2.4 Cattle:** It consists of bullock, cow and young stock.

**Bullock:** The relation between farmer and bullock is very old. Bullock is used in ploughing, sowing and thrashing. It is also used in bringing out water from well, carrying crops from field to houses and markets, and many types of work as well. We can utilize its meat, skin and bone in several ways. Though many machines have been invented for farming yet the poor farmers (mostly in Sindh) cover up the different stages of farming by the help of bullock.

**The Utility of a Breeding Bullock:** Well nourished breeding bullocks become ready for breeding between one and a half and two and a half years. At

the age of six or seven years decline starts in their breeding power. The usefulness of the life of a breeding bullock depends upon its good care, proper food, breed type and right utility. Using natural process of breeding every bullock can be used for sixty to one hundred cows in a year.

Bullock either kept for scientific breeding or natural breeding it is necessary that at the start such cows should be chosen which are fully motivated so that difficulties may not arise at the time of mating. If in the beginning the bullock commits wrong way of mating a cow the process will be difficult to be corrected later on. Cows of high stature should be placed at a lower place while short ones should be put in mating barricades so that the energy of bullock may not be wasted. In order to be aware of energy of the bullock its generating matter should be tested. Many cows may not be pregnant if the bullock is partially or totally weak in fertilizing energy. It may also affect the prospect of birth as well as the quantity of milk in the cow. In order to get best advantage from a bullock, artificial process is adopted.

**Hardworking Bullock:** At present machines are rapidly replacing the load of work for bullock. Still the burden of hard work lies upon the neck of bullocks in the field. Due to less resource, short capital, unavailability of machine parts, unfit machine tools for different kinds of performance and, to a certain extent; the illiteracy of farmers the burden of hard work has not yet been shifted from the neck of bullock. Training for Farming: Mostly every animal is trained for the purpose of farming, and in mountainous areas the unmilch cows are also used for this job. On occasions the milky cows and male buffaloes also take part in this job. Selected animals when they are young and when their bones are matured should be used on the nature of such job. Their suitability depends upon their type, diet, and way of nourishment and freedom from sickness.

**2.5 Cow:** In all milch animals cow is counted as an animal of gentle nature. In Pakistan cow is brought up for three purpose. Firstly in obtaining the energetic bullocks for agriculture, secondly for milk, and thirdly for both purpose. Till today it could not be known that from when the man started keeping cow but through some historical evidences and discovery of some ruins this much is known that in the area of Mohen-Jodaro in Sindh cow was nurtured even before four to five thousand B.C. The seals which have been found from the ruins of Mohen-Jodaro have got the shape and figure which looks like the prints of a cow. It is presumed that from these centres of human culture cow was introduced in the whole world. After sixty or ninety days of delivery, the cow should be made pregnant because through this way a young stock and milk will remain continuing every year.

**2.6 Goats:** Goat is an animal for milk producing. God has gifted it with special quality of fulfilling the daily needs of human being. The biggest quality of this animal is the ability of facing any difficult condition. History tells that goats are found in all countries of the world. In olden times the people of Mohen-Jodaro and Harappa used to bring up goats. The bulk of goats were their capital on which they used to live upon. These people used to eat goats' meat, drink its milk, and cover their bodies with its skin.

Due to its importance and utility goats is still our focus of attention even today. This is the reason that their number has increased, and its trade has attained great approval in our country. Unluckily this profession has been mostly in the hands of illiterates who are unaware of modern techniques of developing this industry. As a matter of fact this animal is not brought up in right manner with appropriate food. Mostly its energy is lost in searching food in hard weather. Their health depends upon their better care. There is a basic difference between goats and sheep in regard to kidding: There was hardly any twin birth in the case of ewes. As for feed, the goat essentially depends on grazing and browsing.

Indeed, the goat is an efficient browser and is a consumer of even the poorest quality dry vegetation including stubbles. This is why these, predominantly, are the animals found grazing on degraded lands, often leading to a conclusion that the goats have been responsible for the degradation. That the sheep and goats, particularly the latter, are responsible for degradation of

forest and other common land has been an unstated or stated assumption for long. With their proper keep-up following advantages are obtained:

- Meat is obtained out of them which is comparatively more tasty and delicious than other animals. Due to no acid in its milk it is better digested by those who have weak digestive system.
- In mountainous areas goats are brought up for milk.
- Goats can also be brought up in unpopulated and desert areas in addition to all types of climatic conditions where other animals find it difficult to remain alive.
- Goats skin is used in making shoes, gloves, sandals, and book bindings.
- Goats dung is the best natural fertilizer for, fruit, flower and vegetable plants. It also proves itself better in land fertility.
- Goat is less expensive and less eating animal.
- Goats dried intestine is very much useful in making tennis rackets.

**2.7 Camels:** The camel is also called a desert boat. For Arabs it is a big capital. It is the only animal who can easily walk on sand with fast speed. Since long ages this animal is used for travelling and carrying goods. History tells that camel was used more for war purposes in olden time than today. In facing journey troubles and difficult routes it has been the best companion of human being. Having the quality of less eating, less sleeping and more labour, giving it is also called as an animal of “darvaish” mentality. The hearing and smelling power of camel is very sharp. It finds out its path from unseen routes with great ease.

The camel serves the purpose of carrying goods and wide travelling in those areas, where, particularly the movement of machine is difficult or impossible. In addition to ground and boundary army the camel also serves the purpose of police.

In the field of agriculture the camel is used in drawing out water from well and ploughing the field for crop sowing. The job of two bullocks is very well done by one camel. From camel hair and skin ropes, bags, blankets, and tents are prepared. Even table lamps and oil containers are also made from its skin. Its milk and meat is also used as a human diet. A common camel can easily drag a weight of 30 mounds through camel cart. Without a camel cart weight of more than 15 mounds should not be put on its back. It should not be driven for more than twenty miles a day. During journey it should be given a rest of 15 to 20 minutes after 5 or 10 miles. It should be given more rest of intervals when it goes on heights. It should not be asked to sit on hard and stony grounds. In order to keep it healthy an arrangement of its sufficient food, water, and a comfortable place is necessary.

### **3. TRENDS AND PERCENTAGE DISTRIBUTION IN LIVESTOCK POPULATION BETWEEN 1955 TO 1996 LIVESTOCK CENSUSES**

Cattle population showed an increasing trend during 1955 to 1996, except for the census year of 1972 and 1976, when it declined to 2800 and 2854 thousand numbers respectively (Table 2 and Figure 1). The highest cattle



population (5464 thousand numbers) was recorded in 1996. The population of buffaloes showed an increasing trend during 1955 to 1996. The population which was 1052 thousand numbers in 1955 reached to a maximum of 5615 thousand numbers in 1996 livestock census. Sheep population also showed an increasing trend during 1955 to 1996, except for the year 1972 when it declined to 840 thousand numbers. The sheep population reached to a maximum of 3710 thousand numbers in 1996, being 1054 thousand numbers in 1955. Goats' population showed an increasing trend in-between 1955 to 1996. Being 1975 thousand numbers in 1955 reached to a maximum of 9734 thousand numbers in 1996. The population of camels showed a fluctuating trend. It decreased in 1960 and 1972.

In 71 there was a war in between India and Pakistan and during that period from district Tharparkar some people migrated to India along with livestock this also results decline. There after it increased up to 225 thousand numbers in 1996. The table clearly shows that from 1976 and onwards the population of goats is maximum among all the types of livestock. In 1996 the population of goats ranks first, buffaloes second, cattle third, sheep fourth and camels last. The total livestock population also showed an increasing trend except for the year 1972, when it declined. The livestock population which was 6216 thousand numbers in 1955 reaches to a maximum of 24748 thousand numbers in 1996.

The same pattern of Table 2 is also observed in Table 3. Goats showed the highest percentage distribution of population from 1976 and onwards. The percentage of 23.9, 25.9 and 26.2 in 1976, 1986 and 1996 is the highest among all types of livestock. In 1955 the total number of goats and buffaloes in Sindh was 3027 thousand. The goats and buffaloes constituted 36.8 percent of the total cattle, buffaloes, sheep, goats, and camels' population. By 1996, there had been a big change. The total population of small and large ruminants had increased to 24748 thousand. The number of goats and buffaloes, however, had increased to 15349 thousand, forming 41.3 percent of the total population of small and large ruminants.

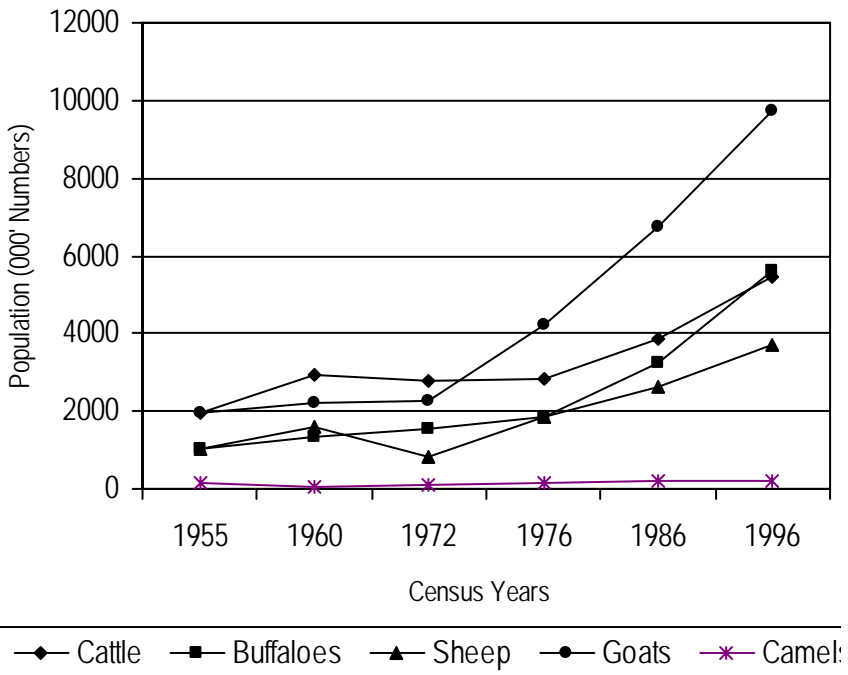
Table – 2  
 Population of Cattle, Buffaloes, Sheep, Goats and Camels  
 in Sindh Province at Different Censuses

Type	1955	1960	1972	1976	1986	1996
Cattle	1959	2936	2800	2854	3874	5464
Buffaloes	1052	1353	1522	1834	3220	5615
Sheep	1054	1590	840	1829	2616	3710
Goats	1975	2201	2275	4237	6755	9734

Camels	176	62	80	144	218	225
GRAND TOTAL	6216	8142	7517	10898	16683	24748

Source: Agricultural Statistics of Pakistan (1999-2000), Government of Pakistan.

Figure – 1  
 Trend Showing Population of Cattle, Buffaloes, Sheep, Goat  
 and Camels in Sindh Province at Different Censuses



#### 4. COMPARISON OF CATTLE, BUFFALOES, SHEEP, GOATS, AND CAMELS IN SINDH DURING 1976-1986 AND 1986-1996

**4.1 1976-1986:** Total cattle population was 3874 thousand. During the said ten years, it had increased by 35.7 percent (Table 4). Total buffalo population was 3220 thousand in 1986. During the said ten years it had increased by 75.5 percent. Total sheep population was 2616 thousand. During ten years it had increased by 43 percent. The population of goats, which were 6755 thousands in 1986, increased by 59.4 percent during the said ten years. The camels' population during the said ten years increased by 51.3 percent. During the said ten years the population of buffaloes increased by more percentage (75.5) as compared to other type of livestock. Goats and camels ranked second and third in percentage increase.

**4.2 1986-1996:** During the said ten years cattle population increased by 41.0 percent, buffaloes by 74.3 percent, sheep by 41.8 percent, goats by 44.1 percent and camels by 3.2 percent. The highest and lowest percentage of increase was recorded in buffaloes (74.3) and camels (3.2). This may be due to harsh famine and drought conditions of 1987. Only the percentage of cattle population increased while that of other type of population decreased in 1986-1996 as compared to 1976-1986.

**Table – 3**  
 Percentage Distribution of Cattle, Buffaloes, Sheep, Goats and Camels  
 in Sindh Total Live Stock Population at Different Censuses

Type	1955	1960	1972	1976	1986	1996
Cattle*	23.8	30.6	26.4	16.1	14.8	14.7
Buffaloes	12.8	14.1	14.3	10.3	12.3	15.1
Sheep	12.8	16.5	7.9	10.3	10.0	10.0
Goats	24.0	22.9	21.5	23.9	25.9	26.2
Camels	2.1	0.6	0.7	0.8	0.8	0.6

\* It includes bullock, cows and young stock.

Source: Agricultural Statistics of Pakistan (1999-2000), Government of Pakistan.

**Table – 4**  
 Comparison of Cattle, Buffaloes, Sheep, Goats and Camels  
 in Sindh Province in 1976, 1986 and 1996

Type	1976	1986	1996	% Difference 1976-1986	% Difference 1986-1996
Cattle	2854	3874	5464	35.7	41.0
Buffaloes	1834	3220	5615	75.5	74.3
Sheep	1829	2616	3710	43.0	41.8
Goats	4237	6755	9734	59.4	44.1
Camels	144	218	225	1.3	3.2

Source: Agricultural Statistics of Pakistan (1999-2000), Government of Pakistan.

## 5. ANNUAL COMPOUND GROWTH RATES<sup>1</sup> OF LIVESTOCK

The change in the composition of livestock population was because of the much higher growth rate in the number of the small ruminants, particularly the goats, compared to that of buffaloes in Sindh (Table 5). During the period 1955-96, the buffaloes' population grew at an average annual rate of 0.04 percent, while cattle grew at 0.17 percent, sheep at 0.24 percent, camels at 0.16 percent and goats at the rate of 0.34 percent. Among the large ruminants, cattle, buffaloes and camels showed very different rates of growth: cattle recorded an average annual growth rate of 0.17 percent, buffaloes 0.04 percent and camels 0.16 percent only, while goats and sheep a rate of 0.34 and 0.24 percent respectively. Thus the two types of livestock that showed relatively high growth rates over the four decades are goats and sheep; the cattle, camels, and buffaloes recorded relatively low growth rates.

Table – 5  
 Annual Compound Growth Rate of Livestock between Two Points in Time  
 (in Percentage)

Census Years	Cattle	Buffaloes	Sheep	Goats	Camels
1955-60	0.40	0.25	0.41	0.11	-1.04
1960-72	-0.05	0.12	-0.64	0.03	0.25
1972-76	0.02	0.19	0.78	0.62	0.59
1976-86	0.30	0.56	0.36	0.45	0.41
1986-96	0.34	0.56	0.35	0.36	0.03
1955-96	0.17	0.04	0.24	0.34	0.16

Of course the growth rates were not uniform from one livestock census to the other during the 41 years, from 1955-96. Cattle and sheep recorded a negative population growth rate in 1960 to 1972, while camels' negative growth rate was in the year from 1955 to 1960. In other census years though the population growth rate is positive but fluctuating. Buffaloes and goats recorded positive but fluctuating growth rate, and do not show negative growth during census years from 1955 to 1996. The smaller ruminants, like goats and sheep are, however, able to recover fast.

The average size of land holding in Sindh is steadily declining and will continue to decline until such time in the distant future when, due to industrialization and consequent emigration from rural areas (or at least from agriculture), the absolute number of people depending on agriculture begins to

<sup>1</sup> The compound growth rates are estimated by using log linear functions on the census years on population. The equation fitted to analyze the trend growth rate is semi-log exponential form.

$\text{Log } Y_t = a + bt$  where,

Y = population of cattle, buffaloes, sheep, goats and camels

a = constant

b = expresses the rate of change and when multiplied by 100 gives the percentage growth rate

t = time variable in year (1, ....., n)

decline. Along with smaller size of average land holding, the proportion of small and marginal land holdings as well as the total land area under such holdings will continue to rise, mainly because in Sindh a majority of the farmers are poorer (Wasim, 1990). Many small and marginal farmers are unable to maintain a pair of bullocks, often even one. But in these categories of cultivators, the average bullock holding per hectare of net sown area is higher than in the case of medium and large farmers. Therefore, over time the proportion of cultivating households without a pair or even one bullock will increase, but the total number of bullocks will also tend to rise. This will be checked, if not reversed, by the growing use of tractors by medium and large farmers. But, at the same time, expansion of irrigation and consequent multiple cropping will mean increased demand for bullocks. Therefore, absolutely, there is no reason to expect a declining rate of growth in the number of bullocks. Of course, there will be a growing number as well as proportion of farmers, essentially marginal and small, who will be without bullocks, because they cannot afford to maintain these.

One reason for the low growth rates of buffaloes in Sindh during 1955-96, is that buffaloes are mostly used by small and medium farmers for the supply of milk and the large farmers have a small number of buffaloes.

The advantage of goats is fully reflected in the growth rate of goats, which is the highest, much higher than all the type of livestock.

The reason for the low growth rate of sheep than goats during 1955-96 in Sindh is that sheep survive in dry zones – cold or hot, while goat survive in widely differing climatic conditions.

The greater profitability of goats than sheep under prevailing conditions in Sindh is mainly due to two reasons: a) the number of kids born per goat, on an average, is greater than per sheep, and (b) the value of output per goat from milk is higher than the value of wool and folding per sheep. It is not surprising, therefore, that while sheep keeping is confined in the province to a small percentage of households, belonging mainly to the traditional shepherd class; goat keeping is expanding steadily with the poorer households in Sindh.

## **6. LIVESTOCK POPULATION COMPARISON BY DISTRICT IN SINDH DURING 1986 AND 1996 CENSUS**

In 1996 as compared to 1986 livestock census cattle population increased in all the districts except in Larkana and Shikarpur (major rice growing districts) (Table 6). Highest number of cattles are found in Tharparkar and lowest in Shikarpur. The highest number of cattle increased (by 282 thousand) in Jacobabad in 1996 as compared to 1986. The lowest number of increase (by 32 thousand) was recorded in Thatta. Though buffaloes are found in all districts but the highest number of buffaloes (772 thousand) are found in Hyderabad and lowest (113 thousand) in Shikarpur in 1996 as compared to 1986. The highest number of increment (by 439 thousand) was recorded in Hyderabad, and lowest increment (by 35 thousand) in Sanghar. Sheep recorded a highest number of population (1100 thousand) in Tharparkar and lowest number of population in Shikarpur (40 thousand) in 1996 as compared to 1986. Sheep population decreased in Sanghar, Larkana and Jacobabad in 1996 as

compared to 1986. The highest number of sheep increased (by 448 thousand) in Jacobabad and remained same in Thatta – (170 thousand) and Sukkur (1919 thousand) in 1996 as compared to 1986. The number of goats increased in all the districts except Thatta, Sanghar, Larkana and Shikarpur in 1996 as compared to 1986. The highest number of goats (2971 thousand) are found in Tharparkar and lowest in Shikarpur in 1996 as compared to 1986. The highest number of increment (by 1292 thousand) was recorded in Tharparkar and lowest increment was recorded in Badin (by 26 thousand). The maximum number of camels (109 thousand) are found in Tharparkar in both the censuses mainly because the climate is too hot. Since Tharparkar is a deserted district, the camels are mostly used for journey and transportation. In Dadu also, its population is high because most of the areas in Dadu consist of mountains and forests. In these situations camels are mostly used for transportation purposes. The highest number of population of cattle, sheep, goats and camels in Tharparkar are mainly because the valley of Nagarparkar is richer in vegetable growth which support these type of livestock. Grazing facilities are also available in Tharparkar in large area. A large number of buffaloes in Hyderabad and Nawabshah are mainly because in these two districts there are a large number of big farmers who can afford their farming.

Table – 6

Population Comparison of Cattle, Buffaloes, Sheep, Goats and Camels  
 by District in Sindh during 1986 and 1996 Censuses  
 (in '000' Numbers)

Division/District	Cattle		Buffaloes		Sheep		Goats		Camels	
	1986	1996	1986	1996	1986	1996	1986	1996	1986	1996
<b>Hyderabad</b>	<b>2140</b>	<b>2777</b>	<b>1394</b>	<b>2484</b>	<b>1727</b>	<b>2174</b>	<b>4213</b>	<b>5939</b>	<b>173</b>	<b>178</b>
Hyderabad	218	436	333	772	50	173	399	854	5	7
Badin	221	289	194	368	96	163	276	302	7	7
Thatta	307	339	145	314	170	170	369	241	10	11
Dadu	367	511	262	437	358	371	744	868	29	36
Tharparkar	695	849	242	340	792	1100	1679	2971	103	109
Sanghar	332	353	218	253	261	197	746	703	11	8
<b>Sukkur</b>	<b>962</b>	<b>1453</b>	<b>997</b>	<b>1606</b>	<b>431</b>	<b>489</b>	<b>1756</b>	<b>2364</b>	<b>34</b>	<b>28</b>
Sukkur	272	381	271	363	119	119	542	644	9	8
Khairpur	289	436	294	493	95	124	576	694	14	9
Nawabshah	401	636	432	750	217	246	638	1026	11	11
<b>Larkana</b>	<b>705</b>	<b>776</b>	<b>697</b>	<b>930</b>	<b>413</b>	<b>758</b>	<b>605</b>	<b>815</b>	<b>10</b>	<b>10</b>
Larkana	246	128	292	253	177	85	182	112	5	1
Shikarpur	145	52	163	113	51	40	135	41	1	–
Jacobabad	314	596	242	564	185	633	288	662	4	9
<b>Karachi</b>	<b>67</b>	<b>172</b>	<b>132</b>	<b>105</b>	<b>45</b>	<b>43</b>	<b>181</b>	<b>323</b>	<b>1</b>	<b>2</b>
Karachi	67	172	132	105	45	43	181	323	1	2

Source: Agricultural Statistics of Pakistan (1999-2000), Government of Pakistan.

## 7. PERCENTAGE OF LIVESTOCK KEEPING HOUSEHOLDS ACCORDING TO THE SIZE OF THEIR CULTIVATED LAND HOLDINGS IN SINDH, 2000

The small farmers (up to 5 hectares) keeping cattle, buffaloes, sheep and goats consist of 31.36, 34.96, 31.63, and 32.49 percent of households respectively (Table 7). Medium farmers (5 to 25 hectares) consist of 49.37, 40.16, 51.96, and 50.51 percent of households who have cattle, buffaloes, sheep, and goats respectively. The large farmers (>25 hectares) consist of a small percentage of livestock. The goat and sheep keeping households in Sindh are largely the poorer households having small and medium farms. They consist of 83.59 and 83.00 percent of goats and sheep keeping households. Their profitability is higher as compared to cattle and buffaloes keeping. As stated earlier that in Sindh a majority of the farmers are poorer with small and

**Table – 7**  
**Distribution of Sample Households Keeping Cattle, Buffaloes, Sheep, Goats and Camels according to the Size of their Cultivated Land Holdings, Sindh, 2000**

Percentage of Livestock Keeping Households					
Size of Land Holdings (Hectare)	Cattle	Buffaloes	Sheep	Goats	Camels
Under 1	0.50	0.60	0.53	0.39	–
1 to under 2.5	10.85	14.33	11.98	13.66	–
2.5 to under 5.0	20.01	20.03	19.12	18.44	–
5.0 to under 7.5	17.92	13.50	14.57	16.21	–
7.5 to under 12.5	20.48	14.000	20.25	19.88	–
12.5 to under 25.0	10.97	12.66	17.14	14.42	–
25.0 to under 50.0	11.03	13.39	19.50	12.12	–
50.0 to under 100.0	5.51	9.03	5.04	4.79	–
100.0 to under 150.0	0.75	0.79	0.58	0.54	–
150.0 and above	1.97	1.66	1.32	1.64	–

Source: 2000 Census of Agriculture (Sindh), Government of Pakistan.

medium land. They can easily afford to keep sheep, goats, and buffaloes as compared to cattle. This is also clear from the table that large farmers consist of those households who has more percentage of cattle and buffaloes as compared to sheep and goats. The small and medium household farmers keeping more percentage of buffaloes, sheep and goats as compared to cattle are because they are used for milk production and the number of kids born per goat and sheep, on an average is greater. Large farmers consist of less percentage of cattle and buffaloes household as compared to small and medium farmers. The less percentage of cattle household keeping by large farmers is mainly because they can afford to use modern technology. Since large farmers have enough income from their cultivated land therefore they do not need to have buffalo farming in order to sell milk.

## 7. CONCLUSION

The major objective of this study was to see the trend and growth rate of cattle, buffaloes, sheep, goats and camels in Sindh during 1955 to 1996, livestock censuses. The study comes with the following major conclusions. The population of cattle, buffaloes, sheep, goats and camels have become steadily more important in the livestock economy of Sindh during the last two livestock census as compared to other provinces. Cattle, buffaloes, sheep, goats and camels population showed an increasing trend during 1955 to 1996 censuses except cattle in 1972 and 1976, sheep in 1972, and camels in 1960, 1972 and 1976, when it showed a decreasing trend in Sindh. The population of goats and buffaloes recorded a positive trend during 1955 to 1996 censuses. the population of goats are maximum among all the types of livestock. The population percentage of buffaloes, sheep, goats and camels decreased while that of cattle increased during 1986-1996, as compared to 1976-1986. The change in the composition of livestock population was because of the much higher growth rate in the number of the small ruminants, particularly the goats, compared to that of buffaloes. Among the large ruminants, cattle, buffaloes and camels showed very different rates of growth: cattle recorded an average annual growth rate of 0.17 percent, buffaloes 0.04 percent and camels 0.16 percent only, while goats and sheep a rate of 0.34 and 0.24 percent respectively. Thus the two types of livestock that showed relatively high growth rates over the four decades are goats and sheep; the cattle, camels and buffaloes recorded relatively low growth rates. Cattle and sheep recorded a negative population growth rate in 1960-1972, while camels negative growth rate was in the year 1955-1960. In other census years though the population growth rate is positive but fluctuating. Buffaloes and goats recorded positive but fluctuating growth rate, and do not have negative growth during census years 1955-1996. The smaller ruminants, like goats and sheep are, however, able to recover fast. One reason for the low growth rates of buffaloes in Sindh during 1955-96, is that buffaloes are mostly used by small and medium farmers for the supply of milk and the large farmers have a small number of buffaloes. The advantage of goats is fully reflected in the growth rate of goats, which is the highest, much higher than all the types of livestock. The reason for the low growth rate of sheep than goats during 1955-96 in Sindh is that sheep survive in dry zones – cold or hot, while goat survive in widely differing climatic conditions. The greater profitability of goats than sheep under prevailing conditions in Sindh is mainly due to two reasons: (a) the number of kids born per goat, on an average, is greater than per sheep and (b) the value of output per goat from milk is higher than the value of wool and folding per sheep. It is not surprising, therefore, that while sheep keeping is confined in the province to a small percentage of households, belonging mainly to the traditional shepherd class, goat keeping is expanding steadily with the poorer households in Sindh. The highest number of cattle, sheep, goats and camels in Tharparkar are mainly because the valley of Nagarparkar is richer in vegetable growth, which support these type of livestock. Grazing facilities are also available in large area. A large number of buffaloes in Hyderabad and Nawabshah are mainly because in these two districts there are a larger number of big farmers who can afford their farming. Large farmers consist of those households who have more percentage of cattles and buffaloes as compared to sheep and goats. The small and



medium household farmers keeping more percentage of buffaloes, sheep and goats as compared to cattle are there because they are used for milk production and the number of kids born per goat and sheep, on an average is greater. The less percentage of cattle household keeping by large farmers is mainly because they can afford to use modern technology. Since large farmers have enough income from their cultivated land therefore they do not need to have a buffaloes farming in order to sell milk.

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