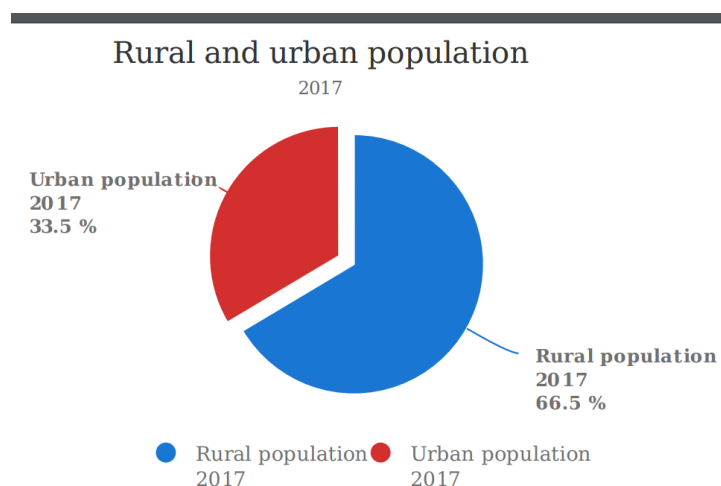


## 1. Introduction

India occupies first position in terms of goat population and milk production. *Chevon* (goat meat) is most preferred and widely consumed meat in the country. Since ancient times goat milk has traditionally been known for its medicinal properties and has recently gained importance in human health due to its proximity to human milk for easy digestibility and it's all round health promoting traits. Still research is needed to explore and validate medicinal properties of goat milk for projecting it as therapeutic milk for human health. Demand for goat milk and milk products for internal consumption and export is expected to rise in coming years. Goat husbandry provides glimpses of future hope for employment generation, nutritional security and prosperity to the millions of small and marginal farmers in the country.

### 1.1 Basic Information of Goat as a livestock in the Country

**1.1.1 Role in Rural Economy :** Among all species of farm animals, Goats have the widest ecological range and have been poor people's most reliable livelihood resource since their domestication during Neolithic Revolution about 10 millennia ago. Goat plays a significant role in providing supplementary income and livelihood to millions of resource poor farmers and landless laborers of rural India. Small ruminant rearing ensures self-employment and acts as a cushion in distress situations like drought and famine.



- 1.1.2 **Role in entrepreneurship:** In last few years, goat production in the country gained momentum in the form of a commercially viable enterprise as evidenced by increasing interest of young entrepreneurs to develop knowledge and skill in this species. In many small-herd dairy goat enterprises, not all does must be milked, so meat is often the main product. Along with meat, the sale of breeding stock from small herds of dairy goats may be an important income source. This versatility allows the producer to plan and operate a more stable economic production unit. In some parts of the world, all breeds may be raised for fiber, meat, and milk and cheese production. Kids of all breeds can be used for meat. However, meat goat carcasses are generally leaner and more muscular than dairy goat carcasses.
- 1.1.3 **Role in global scenario:** India ranks on top in goat population. The demand for meat, milk and fiber is increasing progressively and expected to further rise in future in view of sizable increase in per capita income and health consciousness of people. Worldwide consumers are preferring products that are “clean, green and ethical”. As such goat producers are shifting to husbandry practices that do not compromise the welfare of animals. Medicinal properties of goat milk increased the interest of society to use it as therapeutic health food nutraceutical; moreover, biotechnologists are focusing on designer milk for human health.
- 1.1.4 **Role in Nutrition and Health:** Goats possess distinct social, economical and biological advantages. They can be maintained on a limited area and can sustain on wide variety of vegetation in varied agro-climatic conditions. Goat meat (chevon) is one of most preferred meat type by the consumers in several countries including India. The goat milk is easily digestible due to smaller size of fat globules and serves as a ready source of family nutrition. In India, both demand and production of goat meat have shown steady increase during the last decade and despite the rising

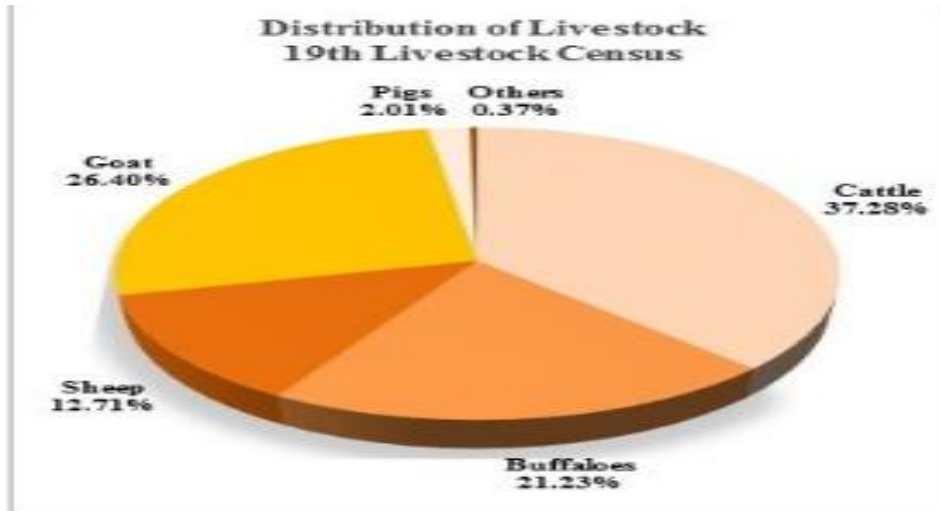
production trend, country would need to double the number of goats to meet the projected requirement of goat meat for growing human population in the coming decades.

## 2. Current Scenario

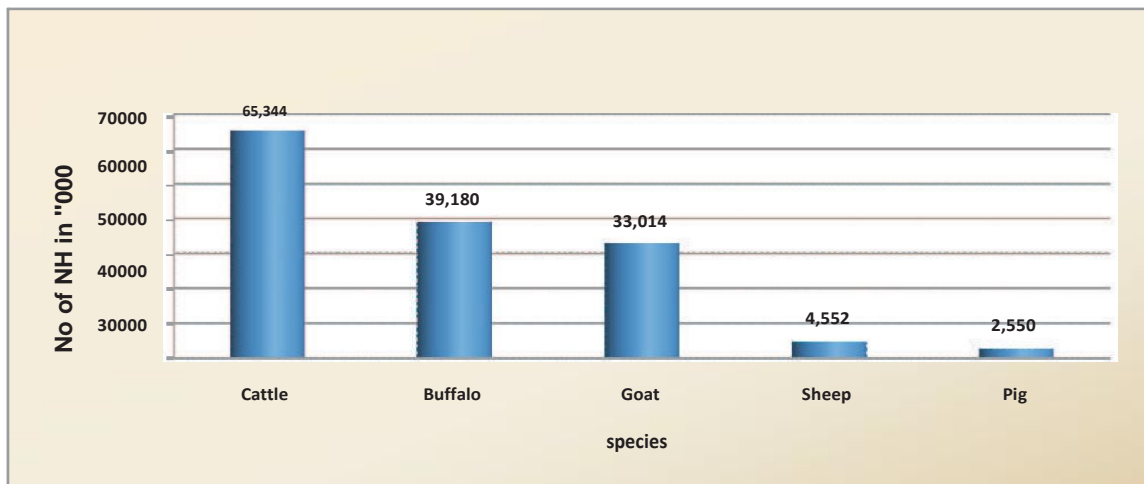
Traditionally goat has served as source of livelihood and financial security to large section of society, mainly comprising of resource-poor people. In the present scenario of changing agro-climatic conditions, this small ruminant farm animal has tremendous potential to be projected as the ‘Future Animal’ for rural and urban prosperity. The backyard goat rearing is steadily turning as the fast growing ‘livestock industry’ in the country. Goat husbandry in India is essentially an endeavor of millions of small holders who rear animals on “Crop Residues” and “Common Property Resources”. The small holders produce milk, meat, fiber, skin etc for the community with virtually no capital, resource and formal training. More often goats are reared for production of meat, but they also serve as ready source for milk to meet the family requirement.

### 2.1 Goat Population

<b>Small Ruminant</b>	<b>Population as per 2012 census</b>	<b>No of farmers holders</b>
Goat	135 million	33.01 million

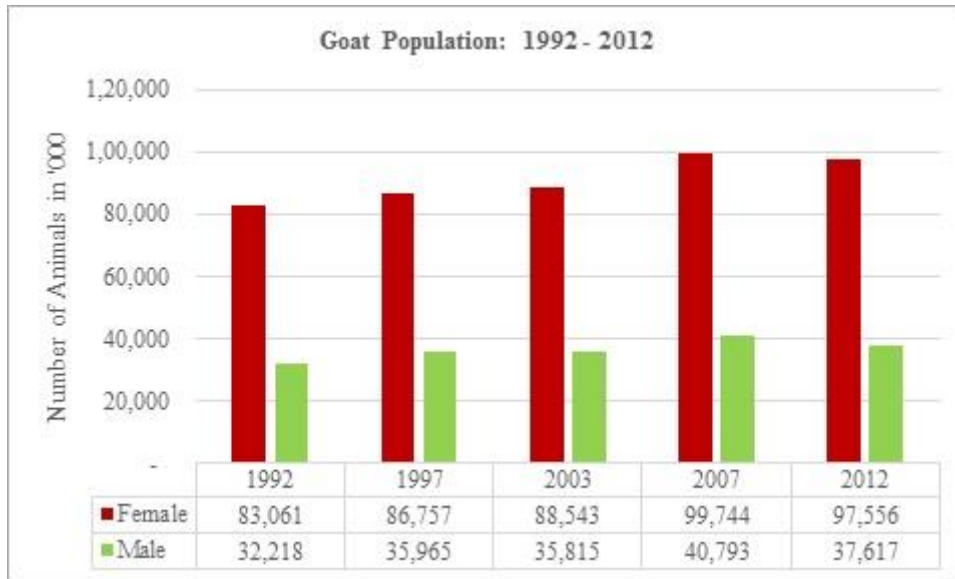


## 2.2 No of Household Enterprises having Cattle, Buffalo, Sheep, Goat & Pig

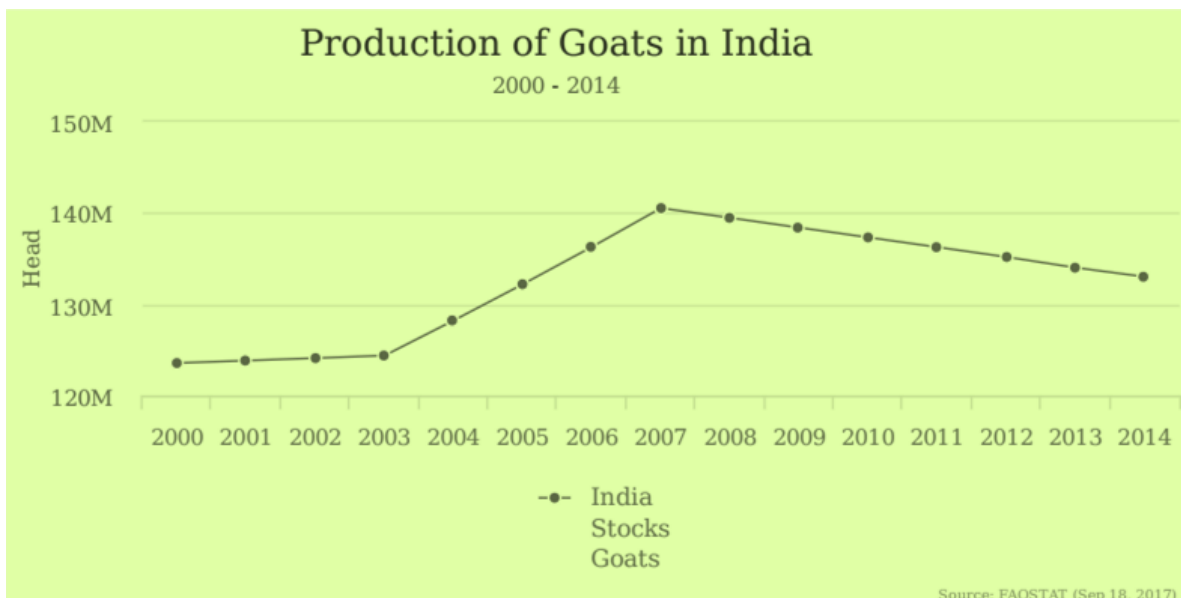


## 2.3 Goat Population in year 1992 – 2012

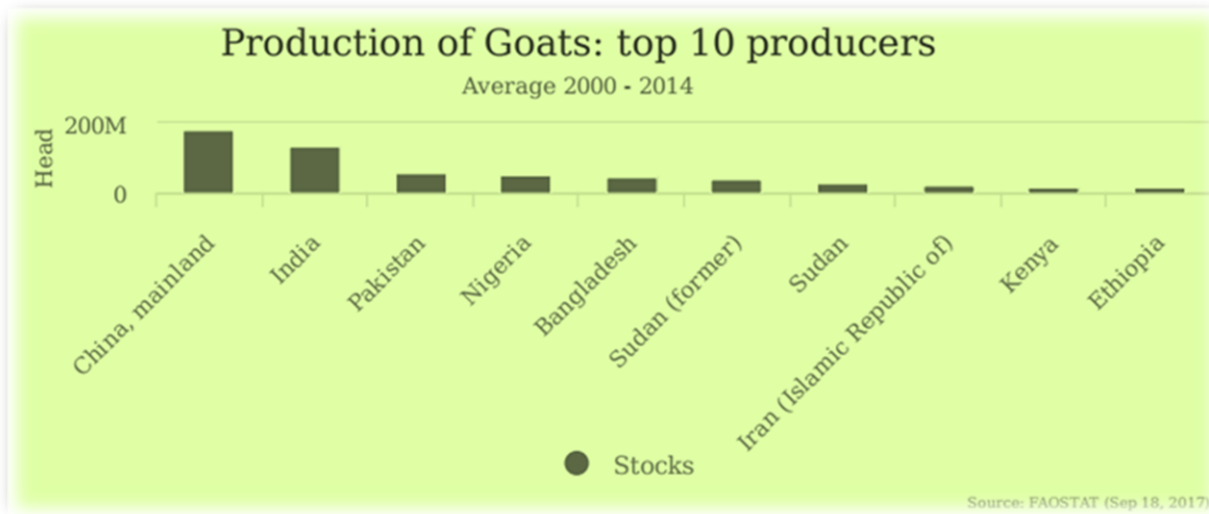
Goats constitute 26.40% of the total livestock population and the 19th Livestock Census puts the number of goats in the country at 135.17 million.



## 2.4 Production of Goats in India- FAO STAT



## 2.5 Production of Goats-top 10 producers in the World.



## 2.6 Registered Breeds of Goat:

Our country has 26 registered breeds of Goat. Out of these, the high genetic merit (more meat / milk yield per animal) indigenous registered breeds exist are only 12 breeds. The 12 breeds of high genetic merit Goat have a population of 4.55crore out of total population of 13.5 crore.

Population as per 2012 census	Number of prominent indigenous breeds	Number of non-descript	% of non descript
135 million	45.5million	82.81 million	61.26%

## 2.6 Comparative chart for prominent Indigenous Goat Breeds

Sl. No	Name of Breed	Original State	Body weight		Dressing %	Carcass weight		Ave. daily Milk yield (in kg)	Breed wise population* (lakhs)
			Male adult	Female adult		Male adult	Female adult		
1	2	3	4	5	6	7	8	9	10

1	Sirohi	RJ	50.37	22.54	47.3	23.8 3	10.6 6	0.41	30.77
2	Marwari	RJ	33.18	25.85	56.3	18.6 8	14.5 5	0.53	71.83
3	Beetal	PJ	59.07	34.97	49.68	29.3 5	17.3 7	1.16	7.15
4	Jhakran a	RJ	57.8	44.48	47	27.1 7	20.9 1	3.18	14.46
5	Black Bengal	WB	32.37	20.38	55.8	18.0 6	11.3 7	NA	206.51
6	Jamnapa ri	UP	44.66	38.03	48.16	21.5 1	18.3 2	1.06	39.13
7	Barbari	UP	36.7	20.3	47.5	17.4 3	9.64	0.71	62.82
8	Mehsan a	GJ	37	32	58	21.4 6	18.5 6	1.32	6.11
9	Zalwadi	GJ	38.84	32.99	47	18.2 5	15.5 1	2.02	5.32
10	Berari	MH	36	33	48	17.2 8	15.8 4	NA	1.92
11	Kutchi	GJ	46.96	39.91	47	22.0 7	18.7 6	1.84	4.43
12	Surti	GJ	29.5	32.03	46.6	13.7 5	14.9 3	2.50	4.06
<b>Total population :</b>									<b>454.51</b>

**\*as per Breed Survey Book 2013**

From the above chart it is clear that out of the total goat population of 13.5 crore, the population of 12 out of 26 registered breeds of Goat is merely 4.55 crore (as per Breed Survey Book, 2013) that is about 33.7%.

### **2.7 Analysis of Goat population and its possible impacts :**

1. From the livestock census data it can be observed that there is no satisfactory increase in Goat population over the years. In fact, there was a decline in population from 2007 census to 2012 census by 4 percent. This is certainly not a positive trend, especially in view of the increase in demand for meat

due to increase in population and changing pattern of food consumption in favour of protein rich food.

2. More so, this decline is (-)7.79% in Male Goat, which is attributed to more culling / death of the male animals, that is.. more reduction of the male goats population than females, can be reproduced of extant reproduction rate.
3. This is attributed as being due to increasing demand of meat in the country as compared to the available animal from the natural reproduction rate.
4. The long term consequence of this could be shortage of Goat meat which in turn has impact on the nutritional requirement fulfillment of the country's population.
5. This will have adverse impact on prices of the meat and then consequential demand for imports which would be detrimental to the goat farmers, normally landless and small/marginal farmers who would loose the opportunity of increasing their income should there have been support from government to produce more Goat.
6. The Goat male and female population growth rate has been 0.78% CAGR and 0.81% CAGR respectively for the period 1992 to 2012 as per chart below with a negative growth rate in the period 2007-12.
7. However, the density of livestock per unit of grazing area has greatly increased, owing to increases in their numbers and the shrinkage of grazing land.

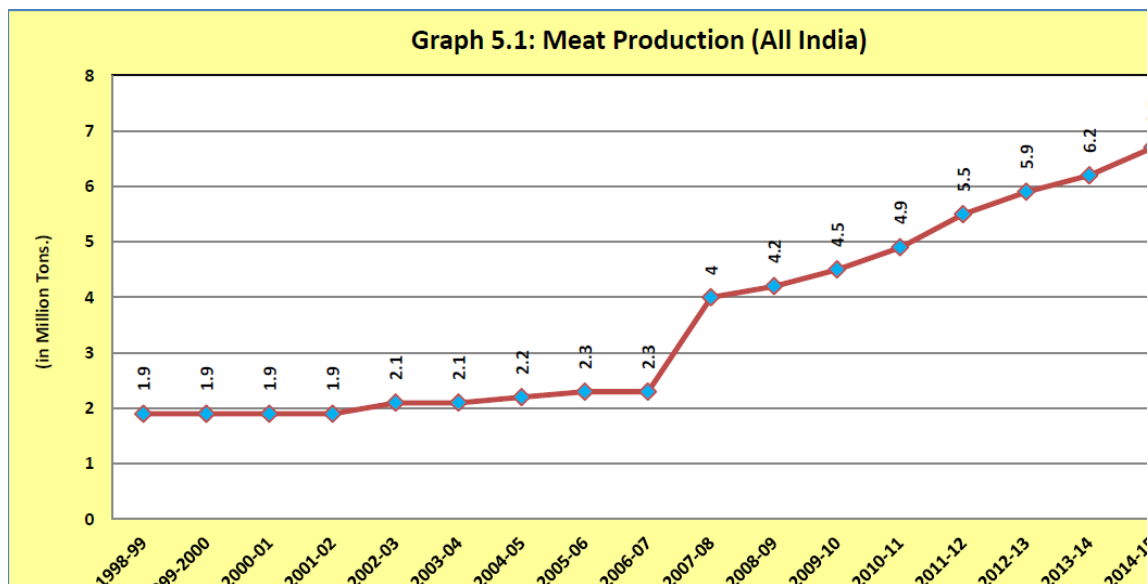
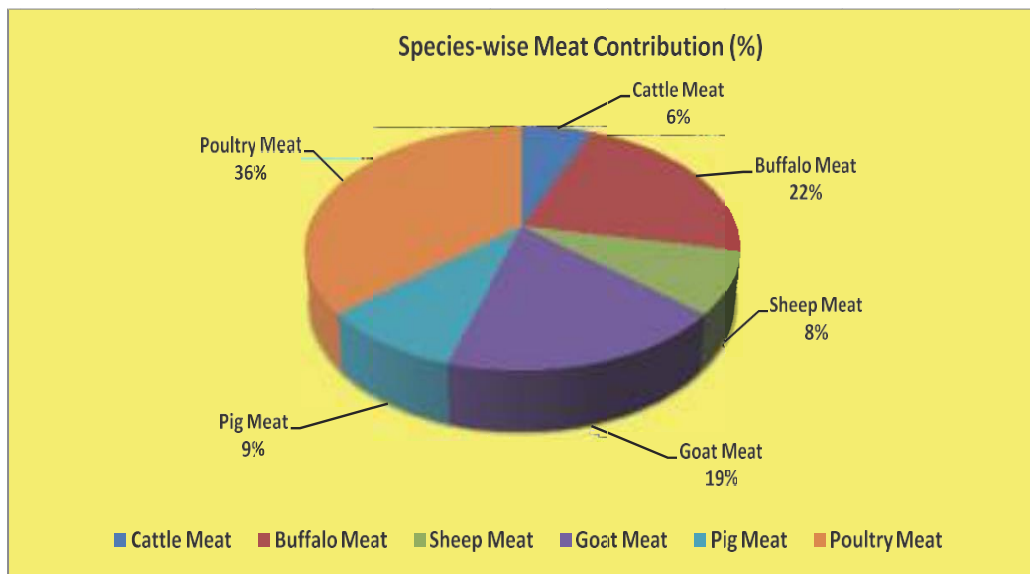
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### 3. Meat Production

The meat production in the country as per 2015-16 data was 7 million tons with a per capita availability of 4.94 kg. Total Goat Meat production in 2015-16, was 942.91 thousand tons. The meat type break up for the country is as below:

#### Species-wise Meat Contribution (%)



### **3.1 Current Chevon Production Analysis**

- Total Goat meat (Chevon) production was 942.93 thousand tons and for this 86182.03 number ,that is, 64% of animals were slaughtered, out of the total population, which has a domestic market value of about 37,717 Cr.(@400/kg meat)
- 75094.75 thousands Goat adults were slaughtered to get 377.55 thousand tons of mutton 11087.28 thousands of young sheep were slaughtered to get 107.97 thousand tons of mutton.
- CAGR is 2.08 %

### **3.2 Export Profile of Chevon in India.**

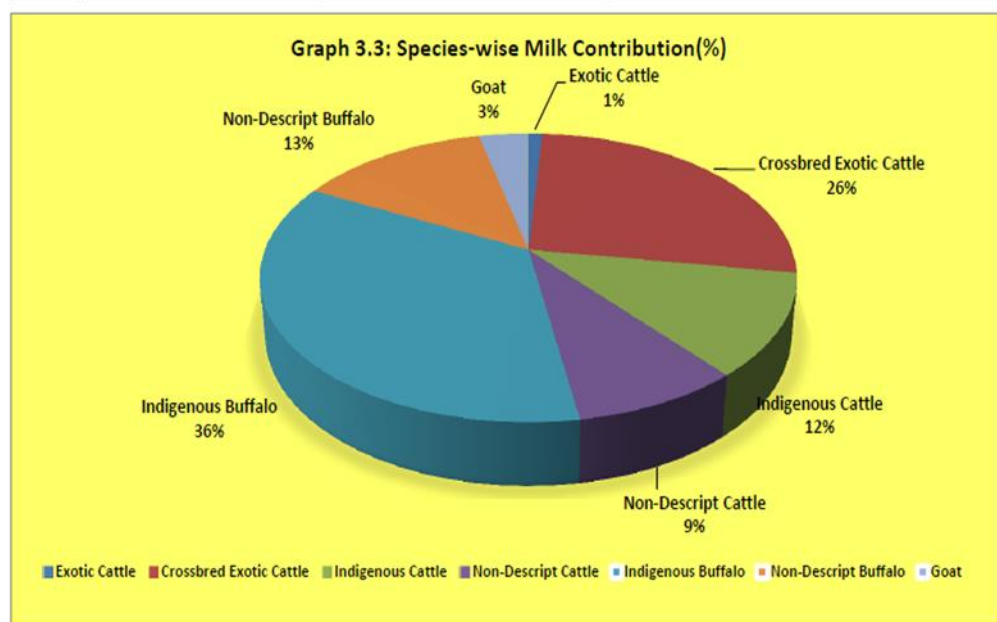
1. The share of Indian meat exports in the worldmarket is less than 2%.
2. India is the largest exporter of Sheep & Goat meat to the world. The country has exported 21,950.71 MT of sheep & goat meat to the world for the worth of Rs. 837.76 crores during the year 2015-16.(APEDA) .
3. Sheep and goat together contributes 20% (13 and 7) of total meat production in the country. Out of this 20%, Goat(Chevon) contributes about 65%.
4. Major Export Destinations (2015-16) : United Arab Emirates, Saudi Arabia, Qatar, Kuwait and Oman.
5. Major producing states are Rajasthan, Jammu & Kashmir, Uttar Pradesh, Gujarat, Hilly regions of North and Eastern Himalays
6. On the outlier hand growth in ovine meat exports was 3.43 percent during 1980-90, which substantially declined and has become negative to the extent of 2.41 percent during 1990-99. The scope for export of sheep, goat and poultry meat is constrained by high domestic demand and prices

## 4 Goat Milk Production

Milk and milk products are the essential food items of human beings which provide sufficient nutritional supplements especially to the children. The milk production in the country has increased from 146.3 million tonnes in 2014-15 to 155.5 in 2015-16 registering a growth of 6.27%. Also, the per capita availability has sharply increased from 225 gm per day in 2003-04 to 337 gm per day in 2015-16.

**4.1 Species wise milk production:** The country stands first in goat milk production and is sharing 26.31% goat milk production in the world.

- ▶ **The** total milk production in the country 155.5 million tones
- ▶ The total Goat milk production 5377.59 thousand tones (3%)
- ▶ growth of 6.27%.



- I. The top 5 states in terms of the goat milk production estimate in India were: Rajasthan, Uttar Pradesh, Madhya Pradesh, Gujarat and Maharashtra during 2014-15.
- II. The goats can be milked any time of the day and are therefore named as the moving refrigerators. Goat milk is prescribed for children, old and sick people as it is easily digestible and has possible medicinal value.

## 5. Goat Production Systems in India

In our country, goats are reared by men and women with diverse working and professional background. The production systems are as numerous as the socio-economic and varied agricultural situations in the country. However, they can be broadly classified into the following:-

- 5.1 **Tethering**: This is common in the sub-humid and humid zones, where probably because of intensive cropping, it is a convenient means of rearing goats from the stand point of control, minimum labour input and utilization of feed *in situ*. It is thus a sedentary system. A variation of this method is combining tethering with grazing up to 5 goats at a time, led by ropes held by women and children.
- 5.2 **Extensive production** : This involves low carrying capacity in situations where land is marginal and is plentiful. It is characterized by low rainfall and various browse plants. The system is used by nomadic people, usually in very low rainfall areas or during winter months when crop residues are available.
- 5.3 **Intensive production**: The goats are fed in confinement with limited access to land. It involves high labour and cash inputs. Cultivated grasses and agro-industrial byproducts are fed *in situ*. This system also has the advantage of allowing control over the animals.
- 5.4 **Semi-intensive production**: This system is practiced to some degree in most of the situations, but the nature and extent of integration depend on the type of crops grown and their suitability to goats. The advantages of this system are increased fertility of land via the return of dung and urine, control of waste herbage growth, reduced fertilizer usage, easier crop management, increased crop yields, and greater economic returns.

## **5.5 Status of Goat industry**

The goat industry in India has yet to be firmly laid down on scientific lines. Goat keepers are maintaining goats in all kinds of situations depending upon the ecology and their circumstances. The minimum goat unit could consist of one goat and the maximum could go to a few hundreds under range management. Goat farming in the country is mainly based on 'zero input'. The fear of mortality has perhaps been largely responsible for not starting many large-scale goat farms. However, large-scale goat farms have successfully running since over last 30 years at the CSWRI Avikanagar, MPKVV Rahuri, and at Leh.

## 6. Demand-Supply Gap Analysis

In India, considerable growth has been recorded in production of goat meat and milk during the last decade. The goat meat production has doubled (9.3% to 18.3%) and goat milk production has shown a growth rate of 31.53% during the last decade. The country stands first in goat milk production and is the second largest meat producer in the world sharing 26.31% goat milk and 10.41% goat meat production. Besides meat and milk, goats also produce good quality skin, valuable *Pashmina* fibre and manure. The goat sector contributes ` 14,453 crores to the agricultural economy of the country through meat (`6851 crores), milk (`4588 crores), skin (`648 crores), etc. which accounts for around 8 per cent of the Gross Domestic Product (GDP) from livestock sector. In addition, the goat sector generates about 4% rural employment and about 20 million small and marginal farmers' and landless labourers' families depend on goats for their livelihood partially or completely. Even then we are not able to meet the increased domestic demand of the products and tap the potential of the sector in its full capacity by using the available opportunities.

- 1) Goat meat has a number of health benefits and more nutritional value than other red meat. Low in calories, total fat, saturated fat and cholesterol than traditional meats, goat meat has higher levels of iron when compared to a similar serving size of beef, pork, lamb and chicken. Comparatively, goat meat also contains higher potassium content with lower sodium levels.
- 2) The availability of meat in India is only about 15g/person/day against the ICMR recommendation of 30g/person/day. Thus it is apparent that there exists a huge gap of meat availability.
- 3) Analysed from the point of required nutrition, as per WHO standards, the daily requirement of protein is 63 gm per day. In average Indian diet conditions, 50.75 gm per day per person (approx.) for the vegetarian population, and about 55.25 gm per day per person (approx.) for the non-vegetarian population is available. Notwithstanding this, the average deficit

of protein requirement is approximately 12.25 gm for vegetarian and 7.75 gm for non-vegetarian.

- 4) As per IGAR and BAHS data, goat population in the country is expected to reach to 216 million in 2050 with milk and skin production to 9.8 and 0.25 million tonnes, respectively. Urbanization, increased income and strong preference to goat meat will be some of major contributing factors for growth in goat meat production. Considering 14 kg per animal carcass weight and 45% of goats available for slaughter, the goat meat production will increase to 1.36 million tonnes by 2050. As per NSSO reports, per capita per month consumption of goat meat/ mutton has increased from 53 gram to 61 gram during 2003-04 to 2009-10. Considering 3% growth in per capita goat meat/mutton consumption, the demand for goat meat by 2050 would be 2.13 million tonnes. (*NIANP, 2013*).
- 5) Moreover, by 2050, it is expected that the population in India would increase by 34% and to fulfill the dietary recommended levels of the livestock products by Indian Council for Medical Research (ICMR) for a population of 1.7 billion people, the livestock sector should produce 186.2 million tons of milk, 18.7 million tons of meat and 306 billion eggs per annum. This means that the current level of production, the milk, meat and eggs would have to increase by 1.5, 3 and 4.7 times respectively. Fulfilling the feed demand of this huge livestock from same resource base of land and water is going to be a huge challenge. Therefore, rather than increasing the number of animals, improving the genetics through breed improvement programme might be a better strategy to address the required demand for animal protein.

**As per ICAR data and Basic Animal Husbandry Statistics, following are some of the short term projections:**

<b>Indicators</b>	<b>India (2015-16)</b>	<b>Current Production CAGR %</b>	<b>Projections 2022</b>	<b>CAGR %applied for projections</b>
Goat Milk Production	5.4 Million Metric Ton	2.14	8.2 Million MT	7
Chevon Production	0.94 Million MT	2.08	1.26Million MT	5

## **6.1 Doubling Farmers Income**

6.1.1 Past strategy for development of the agriculture sector in India has focused primarily on raising agricultural output and improving food security. The net result has been a 45 per cent increase in per person food production, which has made India not only food self-sufficient at aggregate level, but also a net food exporting country.

6.1.2 It is apparent that income earned by a farmer from agriculture is crucial to address agrarian distress (Chand 2016) and promote farmers welfare. In this background, the goal set to double farmers' income by 2022-23 is central to promote farmers welfare, reduce agrarian distress and bring parity between income of farmers and those working in non-agricultural professions.

6.1.3 In the Goat farming sector, Doubling the income of farmers through different interventions which can make the sector more organised and strengthened would definitely increase the output or the income of the sector.



6.1.4 Key areas of Doubling the income of farmers are,

1. Improvement in productivity of animals.
1. 41resource use efficiency or saving in cost of production
2. increase in production intensity
3. Diversification towards high value products/ Value addition of Products.

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## 7. SWOT Analysis of Goat Farming Sector

<b>STRENGTHS</b>	<b>WEAKNESS</b>
<ol style="list-style-type: none"> <li>1. India is having the second highest number of Sheep &amp; Goat. (After China).</li> <li>2. Extraordinary hardiness and ability to adapt to the most harsh regions and facility of movement in rugged and harsher terrains</li> <li>3. Indigenous breeds with good potential</li> <li>4. Marketing potential for wool and meat.</li> <li>5. Regulatory compliance.</li> <li>6. Low production costs compared to other breeds and animal species</li> </ol>	<ol style="list-style-type: none"> <li>1. Unorganised structure of sector.</li> <li>2. Lack of marketing infrastructure facilities for Value addition such as meat processing, warehousing, Cold storage, refrigerated vehicles</li> <li>3. Absence of Public Private Partnership.</li> <li>4. Lack of demand driven interventions</li> <li>5. Scarcity of good breeding stock,</li> <li>6. Inadequate veterinary and extension services,</li> <li>7. Lack of credit and access to markets.</li> </ol>
<b>OPPORTUNITIES</b>	<b>THREATS</b>
<ol style="list-style-type: none"> <li>1. The growing demand of products</li> <li>2. Low start-up cost</li> <li>3. Integrated Systems Farming/ Mixed Species Farming</li> <li>4. Untapped potential for the export &amp; value added products.</li> <li>5. Paradigm shift in Government policies.</li> <li>6. Modern production technologies</li> </ol>	<ol style="list-style-type: none"> <li>1. Extreme climatic conditions and natural calamities.</li> <li>2. Invasion of diseases</li> <li>3. Depletion of natural resources (pastural land)</li> <li>4. Urbanisation.</li> <li>5. Tax regulations for marketing and other transactions.</li> </ol>

## **8.Challenges of the Goat Rearing Sector**

### **8.1 Types of Challenges**

The future well being of the Indian Goat industry depends on the potential for profitability, which is affected by various challenges and opportunities. There are three kinds of Challenges observed in the sector.

1. Technical Challenges
2. Commercial Challenges
3. Other Challenges

#### **8.1.1 Technical Challenges**

1. Unavailability of high Genetic Potential breeds of Goat.(Livestock breeds and breeding)
2. Absence of high productive exotic breed for Crossbreeding
3. Lack of Scientific feeding practices
4. Health challenges like PPR,CCPP etc..
5. High kid mortality
6. Proper animal health services and Availability of drugs

#### **8.1.2 Commercial Challenges**

1. Marketing facilities
2. Unorganised nature of the sector
3. Endemic disease problems, and trans-boundary disease risks,
4. Feed resources (Grassland based ruminant systems are largely dependent on pasture grazing) and Feed supply chains (compound feed mixing and milling),
5. Institutional support for entrepreneurship.

#### **8.1.3 Other Challenges**

##### **(1) Competition for resources**

###### **(i) Land**

In the more arid–semiarid areas, livestock are a key mechanism for managing risk, but population increases are fragmenting rangelands in many places, making it

increasingly difficult for pastoralists to gain access to the feed and water resources that they have traditionally been able to access.

#### (ii) Water

Groundwater and freshwater resources play an important role in water supply: between 1.5 and 3 billion people depend on groundwater for drinking, and in some regions water tables are declining unremittingly (Rodell *et al.* 2009). By 2025, 64 per cent of the world's population will live in water-stressed basins, compared with 38 per cent today (Rosegrant *et al.* 2002). Increasing livestock numbers in the future will clearly add to the demand for water, particularly in the production of livestock feed:

### **(2) Climate change**

Climate change may have substantial effects on the global livestock sector. Increasing climate variability will undoubtedly increase livestock production risks as well as reduce the ability of farmers to manage these risks.

In the more intensive systems, progress could be made in mitigating GHG emissions from the livestock sector via increases in the efficiency of production using available technology, for the most part, and this may involve some shifting towards monogastric species.

### **(3) Socio-cultural modifiers**

Social and cultural drivers of change are having profound effects on livestock systems in particular places, although it is often unclear how these drivers play out in relation to impacts on livestock and livestock systems. Livestock have multiple roles in human society. They contribute substantially and directly to food security and to human health. For poor and under-nourished people, particularly children, the addition of modest amounts of livestock products to their diets can have substantial benefits for physical and mental health.

Livestock also serve as financial instruments, by providing households with an alternative for storing savings or accumulated capital, and they can be sold and transformed into cash as needed and so also provide an instrument of liquidity, consumption smoothing and insurance. For some poorer households, livestock can provide a means of income diversification to help deal with times of stress.

In addition to their food security, human health, economic and environmental roles, livestock have important social and cultural roles.

#### **(4) Ethical concerns as a driver of change**

Ethical concerns may play an increasing role in affecting the production and consumption of livestock products. Recent high-profile calls to flock to the banner of global vegetarianism, backed by exaggerated claims of livestock's role in anthropogenic global greenhouse gas emissions, though debated, it could become an issue sometimes in future.

#### **(5) Wildcard drivers of change**

There is considerable uncertainty related to technological development and to social and cultural change.

##### **(i) Artificial meat (more correctly, *in vitro* meat)**

From a technological point of view, this may not be a wildcard at all, as its development is generally held to be perfectly feasible ([Cuhls 2008](#)), and indeed research projects on it have been running for a decade already. *In vitro* meat could potentially bypass many of the public health issues that are currently associated with livestock-based meat. The development and uptake of *in vitro* meat on a large scale would unquestionably be hugely disruptive to the traditional livestock sector.

##### **(ii) Nanotechnology**

This refers to an extremely dynamic field of research and application associated with particles of 1–100 nm in size (the size range of many molecules). Some particles of this size have peculiar physical and chemical properties, and it is such

peculiarities that nanotechnology seeks to exploit. Nanoparticles may be able to affect nutrient uptake and induce more efficient utilization of nutrients for milk production, for example. One possible approach to animal waste management involves adding nanoparticles to manure to enhance biogas production from anaerobic digesters or to reduce odours ([Scott 2006](#)).

(iii) Deepening social concerns about specific technology

Much evidence points to a serious disconnect between science and public perceptions. Marked distrust of science is a recurring theme in polls of public perceptions of nuclear energy, genetic modification and, spectacularly, anthropogenic global warming. One of several key reasons for this distrust is a lack of credible, transparent and well-communicated risk analyses associated with many of the highly technological issues of the day. One area where there are numerous potential applications to agriculture is the use of transgenic methodology to develop new or altered strains of livestock. These applications include ‘... improved milk production and composition, increased growth rate, improved feed usage, improved carcass composition, increased disease resistance, enhanced reproductive performance, and increased prolificacy’ ([Wheeler 2007](#), p. 204). Social concerns could seriously jeopardize even the judicious application of such new science and technology in providing enormous economic, environmental and social benefits. If this is to be avoided, technology innovation has to take fully into account the health and environmental risks to which new technology may give rise. Serious and rapid attention needs to be given to risk analysis and communications policy.

## **8.2 Strategies to address the Challenges**

In order to attain the targets of National Action Plan, primary attention shall be given to the overall improvement of the sheep rearing sector which includes the following factors,

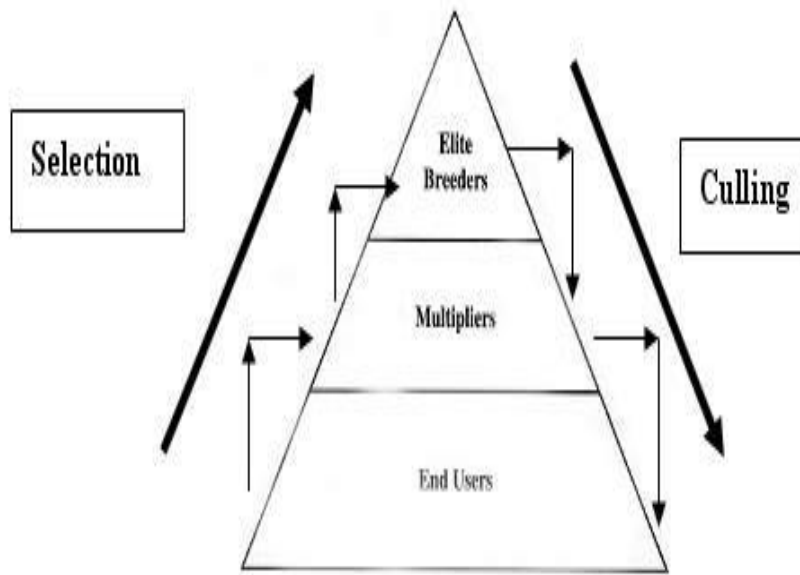
- 1 Breeding and Genetics
- 2 Nutrition
- 3 Health Improvement and Prevention of Diseases
- 4 Marketing
- 5 Other Farmer and Animal Welfare activities.

### **8.2.1 Breeding and Genetics**

To increase the meat and milk production per se and per animal, breed improvement is the key strategy. There are several Methods of Genetic Improvement of Indian Goat, which includes the 4 step Action Plan with focus on separate identified breeds for meat and milk production. The 4 steps are:

1. Breed Improvement of the identified breeds of Goat from amongst the same breed but higher comparative genetic merit animal (example – better Sirohi Goat for higher weight of meat per animal by selective breeding from amongst the same species better genotypes/phenotypes) – that is pure line high genetic merit breeding
2. Breed improvement of identified breeds of lesser genetic merit (example selective breeding of lesser breed Marwari with better species breed of Sirohi Goat) – that is hybrid high genetic merit breeding
3. Breed improvement of much lower yield but high population non-descript breed which is typically lesser in genetic merit than the least merit identified breed itself – that is hybrid of low genetic merit non-descript breed with high genetic identified breed
4. Breed improvement through hybrid of high genetic merit exotic germplasm of suitable genetic traits for higher meat and milk production.

**Figure:-Hierarchical structure of gene flow**



### 8.2.2 Goat Nutrition Improvement

- 1) The nutritional needs of farm animals with respect to energy, protein, minerals and vitamins have long been known, and these have been refined in recent decades.
- 2) Poor nutrition is one of the major production constraints in smallholder systems,
- 3) There are also prospects for using novel feeds from various sources to provide alternative sources of protein and energy, such as plantation crops and crops such as maize, sorghum, millet and groundnut.
- 4) Addressing the nutritional constraints faced by pastoralists in extensive rangeland systems in the developing world is extremely difficult. While there is potential to improve livestock productivity in semi-arid and arid areas, probably the most feasible solutions require integrated application of what is already known, rather than new technology. This could involve dissemination of information from farmer to scientists and vice versa.
- 5) Public health issues will become increasingly important, such as concerns associated with the use of antibiotics in animal production, including microbiological hazards and residues in food. So keeping in



view of consumer concerns for food safety and quality, we need to make awareness to the farmers with regard to the judicious use of antibiotics/vaccines.

### **8.2.3 Health Improvement and Prevention of Diseases.**

Occurrence of diseases causes heavy economic losses in terms of livestock health and production. Advances in animal health are expected to play a major role in the progress of livestock industry. Control of animal diseases assumes prime importance in the crucial time of shifting of animal agriculture from extensive to intensive and commercial system of management. Presence and accumulation of infectious agents in the environment lead to reduction in quality and quantity of animal products. Strategic control and eradication of economically important diseases will result in enhancing goat production in the country.

Diseases in Goats can be broadly classified as non-infectious and infectious. Prevention of disease plays a major role in increasing profitability in a Goat farm. Vaccination against infectious diseases is an important component of health management.

a) Non-infectious diseases:- Approximately 80% of deaths in kids have been estimated due to non-infectious causes. Starvation, primarily from mismothering and behaviour, nutritional and environmental stress, reproductive problems and predation are the major causes reported (pneumonia, acidosis etc...)

b) Infectious diseases:-In most of the diseases like Blue Tongue, ET and PPR the incubation period is less than 24 hrs. Antibiotics are recommended to check secondary infections. Vaccination is the best control.

c) Deficiency diseases:-

- Young Goat grazing on drought-stricken pastures can suffer serious depletion of reserves of minerals and vitamins.

- Calcium and Glucose: Characterized by Pregnancy Toxemia, Ketosis, Lactational problems and Fatty-liver disease. Growth and Milk production may also severely affected..
- Calcium, Phosphorous & Vit. D : The daily requirement of Ca, P & Vit. D for an adult Goat is about 2.5 gm, 1.5 gm and 300-500 units, respectively. Deficiency may result in rickets in kids and Osteomalacia in adults. Mineral supplementation in diet is essential to prevent this deficiency.
- Vitamin A : Vit. A deficiency occurs in Goats on dry countryside during periods of drought. Symptoms include night blindness, corneal keratinization, ptyriasis, hoof defects, loss of weight and infertility. Congenital defects are common in the offspring of deficient dams. Animals should have access to green pasture and should be supplied with Vit. A in feed to prevent deficiency.

In India, the last few decades have seen a general reduction in the burden of livestock diseases, except PPR as a result of more effective drugs and vaccines and improvements in diagnostic technologies and services.

#### **8.2.4 Marketing(Goat Meat and Milk Processing Sector)**

Meat production and supply of meat for local consumption is the most neglected sector in the country. Meat is sold in open premises leading to contamination from dirt, dust, flies and other pollutants. The traditional production systems and the unhygienic practices have ruined and flawed the image of the Indian meat industry. Indian meat industry on scientific and modern lines is need for benefiting livestock producers, processors, finally consumers.

- Development of adequate market infrastructure with basic requirements is must for marketing.
- Because of the unorganized nature of the sector farmer is not getting good price.

- Lack of scientifically designed good abattoirs and processing plants discourage the farmer to start scientific rearing of meat goats/limit the flock number.
- Quality Assurance of Goat meat quality assurance needs to be addressed..
- Along with the production and productivity increase marketing facilities should be prioritized to compete the export markets and to increase the income.
- Processing and value addition to goat meat and milk products and by-products is urgently required.

The following activities shall be undertaken to tap the domestic as well as export markets.

- 1. Setting up of State of Art- Abattoir cum meat processing plants:** In India, there are only 10 most modern state of art mechanized abattoir cum meat processing plants in various states for slaughtering of buffaloes and sheep. These plants are eco-friendly as the by-products are utilized for production of MBM, tallow, bone chips etc. In addition, establishment of Effluent Treatment Plant for waste water treatment from abattoir and lairage, with the water discharged having BOD values 30 ppm. These plants follow SPS measures prescribed by the International Animal Health Code of O.I.E. To meet the requirement we need more scientifically designed abottairs and meat processing plants.
- 2. Raising Meat Breeds of Goats:** In India a major potential exists for Goat rearing for meat purposes. The meat breeds can be salvaged for meat production thereby improving the economic condition of the farmers and also meat production for domestic and export market. These animals can be reared without the use of hormones, antibiotics, and growth promoters. They can then be slaughtered scientifically for meat production.
- 3. The Rearing Bucks:** Contractual farming as backward integration to modern abattoir: A strong need has been felt to establish a production base around

Each modern abattoir to produce quality and disease free animals as per SPS requirements of O.I.E. The success story of broiler farming with contract farming can be employed here to safeguard the interest of small and marginal farmers by providing them the feed, medicine and marketing of finished product and ascertaining a fixed remuneration to farmers.

4. **Setting up cold storages:** Meat is nutrient dense food which makes it perishable commodity. In order to improve keeping quality of meat, cold chain is of crucial importance during transport as well as storage till it reaches to consumers. The Government should support setting up cold storages, supply/value chain and 100% export oriented slaughter houses in the country.
5. **Development of a protocol for small size modern slaughterhouse,** which can be implemented through veterinary Research Institutions.
6. **Value addition and Processing of Goat Milk and Meat:** For commercial exploitation of the value added goat foods, development of shelf stable products assumes greater importance and work will be carried out in this direction. Novel functional products such as antioxidant enriched, omega-3 fatty acids enriched, low cholesterol goat milk products, herbal products, low calorie indigenous goat foods and minerals and vitamins fortified functional products and low cholesterol foods will be evaluated. It is suggested that convergence of activities of different Departments like MoFPI, DoC..etc can be promoted for this.
7. **Consumer Oriented Programmes:** Shelf life enhancement employing novel processing and packaging options will be critical to address the issues of production of quality products for wider marketing network. Newer healthful and functional ingredients such as fruits, vitamins, bioactive peptides & natural antioxidants, and probiotics could be incorporated into product formulation to enhance value and offer consumers. Under this we can promote Self Help Groups, Women SHGs ,Youth Entrepreneurship programmes by including in the existing category of EDEG like schemes.

8. **Marketing Development:** Understanding the market and preparing it to respond to emerging market trends would be the prime instrument for enhancing the domestic livelihood opportunities in the goat sector. Most of the meat production and marketing practices in India are traditional. Well-integrated marketing system for meat and meat products is lacking in India. The main reasons are monopoly of meat trader, lack of coordination between production and demand, too many middlemen in the trade and inefficiency management in slaughterhouse. There is a dire need to modernize the meat production and marketing system. Government of India is keen to improve the marketing system so that the consumers would get the quality meat and meat products at reasonable prices. So, this is the time to think about E-marketing Portal or other E connectivity methods and Use of Marketing Intelligence facilities.

#### 9. **National Animal Identification System for Traceability**

There is a growing worldwide trend for countries to implement whole-of-life traceability systems for livestock due to the following reasons.

- 1) Massive increase in demand for food of animal origin
- 2) Longer and more complex transport and value chains
- 3) Intensification of production systems and development of industrial private sector
- 4) Reduction of public investment, transfer of certain services to private sector and awareness of shared responsibility
- 5) Awareness of consumers about food safety, quality, animal welfare and the environment
- 6) To increase the revenue through Exports.

The system improves food safety, acts as a market export assurance program which improves India's access to foreign export markets, and assists with disease control, tracing and management. Farmers must register their property with their local

jurisdictional government if they hold one or more heads of livestock. As far as trade barriers of Indian Exports are concerned, traceability of Sheep and Goat is a problem especially, to meet the requirements of trading partners (such as the EU) of Developed countries. So, National Livestock Identification System (NLIS) is need of the hour as we are intending to increase the exports of livestock products.

### **8.2.5 Other Farmer and Animal welfare activities**

The Goat development sector as a whole is unorganised. So, to organise the sector is the need of the hour. The following farmer oriented cum animal welfare activities can be considered for this purpose.

- 1) **Scheme for Social Security for Goat Breeders ;** Insurance schemes which will provide financial and social security to the farmer. The basic objective of the Goat Insurance Scheme is to provide insurance cover to animal in the case of accident including fire, lightning, storm, tempest, flood, inundation, earthquake, famine and diseases contracted or occurring during the period of the policy for project areas.
- 2) Developmental projects in the mode of Public Private Participation.
- 3) Common Facility Centre (CFC) for the rural Goat farmers
- 4) Efforts to make sector organizations/ co-operatives, to strengthen the production side ie, Production of good quality animals for slaughter is must for production of good quality meat. Hence, farmers' cooperative can play a major role in the field of production and marketing of quality animals, extension education and encouragement of backward integration / contract farming as in poultry industry for intensive and semi-intensive system of rearing small ruminants.

## **9. National Action Plan 2022**

### 9.1 Objectives of National Action Plan 2022

Based on the Opportunities and Resources and keeping in mind the challenges, a National Action Plan is hereby proposed. The key objectives are:

- 1) To increase the production and productivity of Goat Farming sector.
- 2) To meet the increased consumption demand of Chevon and Goat Milk.
- 3) Organization of sector and Development of Agripreneurship and Doubling of Farmers income

### 9.2 Physical Targets of National Action Plan

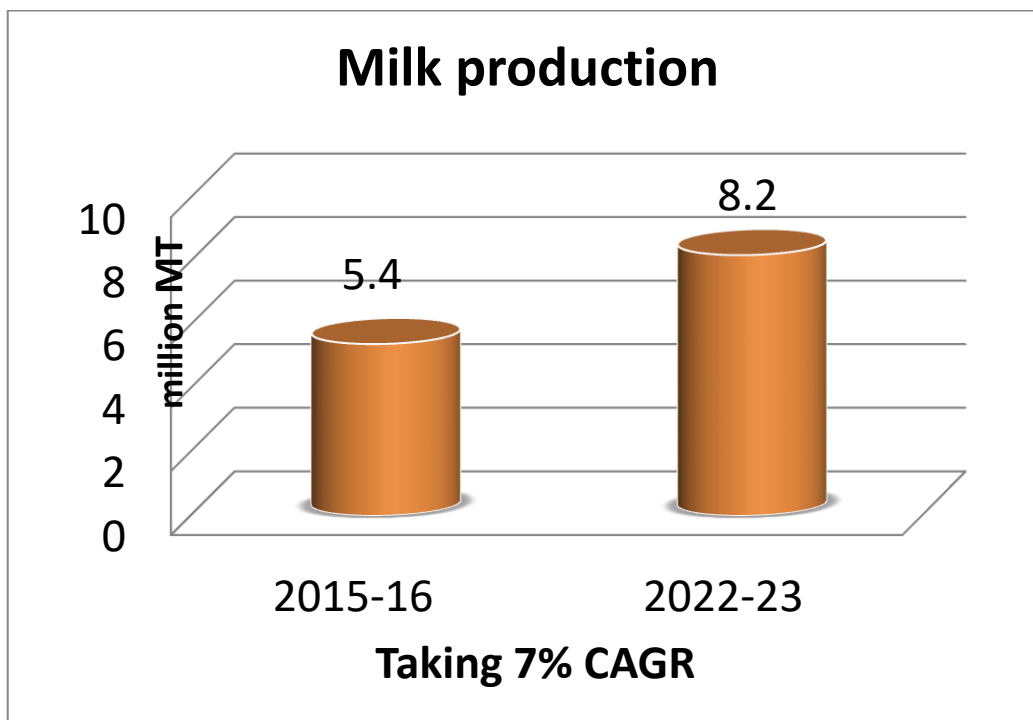
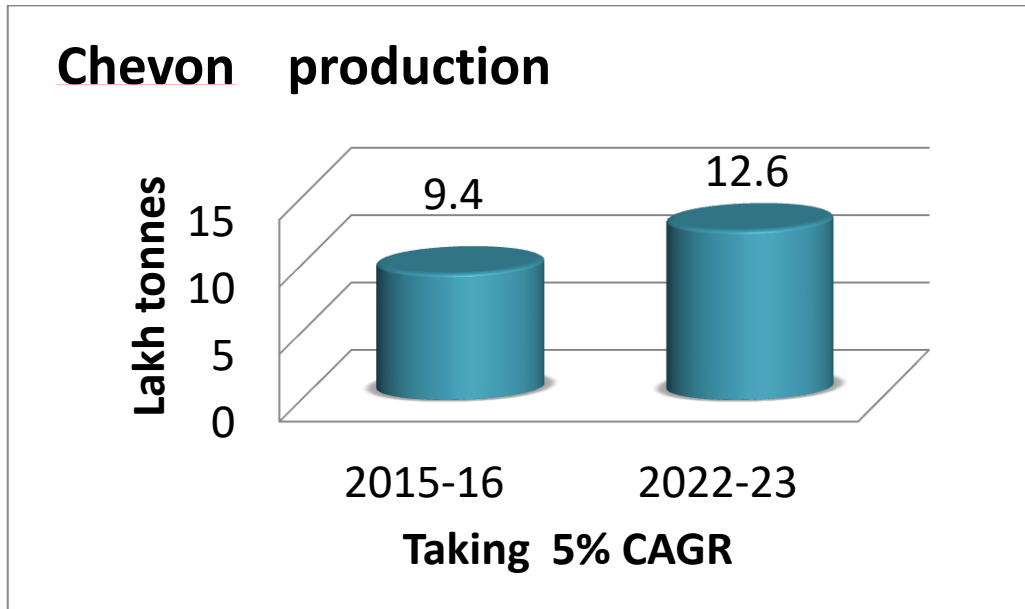
Species	Production Parameter	2015-16 production	Target of Production by 2022	Target of Production by 2022	No of additional Animals required to achieve the target(million),( average yield of meat @ 11kg(BAHS)and average 98 kg milk/lactation 196 days	Total No of Animals required to achieve the targeted production(135 million as per 2012 LC)
Goat	Milk	5.4 Million MT	7.00%	8.2 Million MT	82	217 Million
	Meat(Chevon)	9.4 Lac Tonnes	5.00%	12.6 Lac Tonnes	114.55	249.55 Million

**During** 2015-16, out of the total population of 135 million, 32464.58 thousands of Goats were in-milk and the total milk production was 5.4 Million MT. The average yield of animal /lactation period of 196 days is 98 kg. Also, during 2015-16, 75094.75 thousands adult Goats and 11087.28 thousands young Goats were slaughtered to produce 9.4 Lac tonnes of Chevon. The average yield of meat/animal was 11 kg.

The plan envisages, increasing the Chevon production to 12.6 Lac Tonnes and 8.2 Million MT of Milk from the non-descript population anticipated to be



achieved through genetic improvement. At present the Goat population is 135 Million and to achieve the physical targets, an increase of approx.114 million more animals needed.



## 9.3 Key Strategies

### 9.3.1 To increase the production and productivity of Goat Farming sector, the following are the key strategies

- i. Genetic Improvement of Indigenous Goat through Open Nucleus breeding scheme.
  - ii. Strengthening of Government Goat Breeding farms.
- i. Open Nucleus Breeding Scheme for Conservation and Improvement(Formation of ONBS)**

A Nucleus Breeding Program is a centralized improvement program method, in which very superior animals are brought together from supply farms to form an elite nucleus flock. Farmers have to agree to put their superior animals together. The nucleus or base may remain open to the best animals from the supply flocks. This system is, therefore, called the **Open Nucleus Breeding Scheme(ONBS)**. Once the nucleus is established, an efficient recording and selection program can be implemented. Farmers in an area using the same communal grazing area can be organized to undertake a breed improvement program together. They can, select elite animals among the total flock to form a nucleus flock of breeding females. These will be mated to selected males (EXOTIC/Indigenous) to produce the next generation. This is coupled with continuous culling of inferior animals. Records on the performance of the nucleus flocks and their offspring will be kept. Rigorous selection and culling will be done continuously. The best animals will be retained and the least performing ones eliminated from the nucleus herd. High performing animals that have performances better than those culled from the nucleus herd selected from the annual round of inspections and selection among the village flocks will be promoted to membership of the nucleus flock. This process will continue resulting in a progressive increment of the average performance of the nucleus herd from generation to generation.

ONBS will have the following advantages:

- Animals entering the nucleus are tested under farm conditions;
- Selection is based on records for traits of economic value;
- The improvements are quickly spread as farmers participating in the schemes receive their replacement sires from the nucleus;
- A rapid generation turnover can be maintained;
- Inbreeding is avoided;
- Objectives are maintained for many years; and Small farmers benefit from coordinated effort, policy, pooled experience and shared facilities.

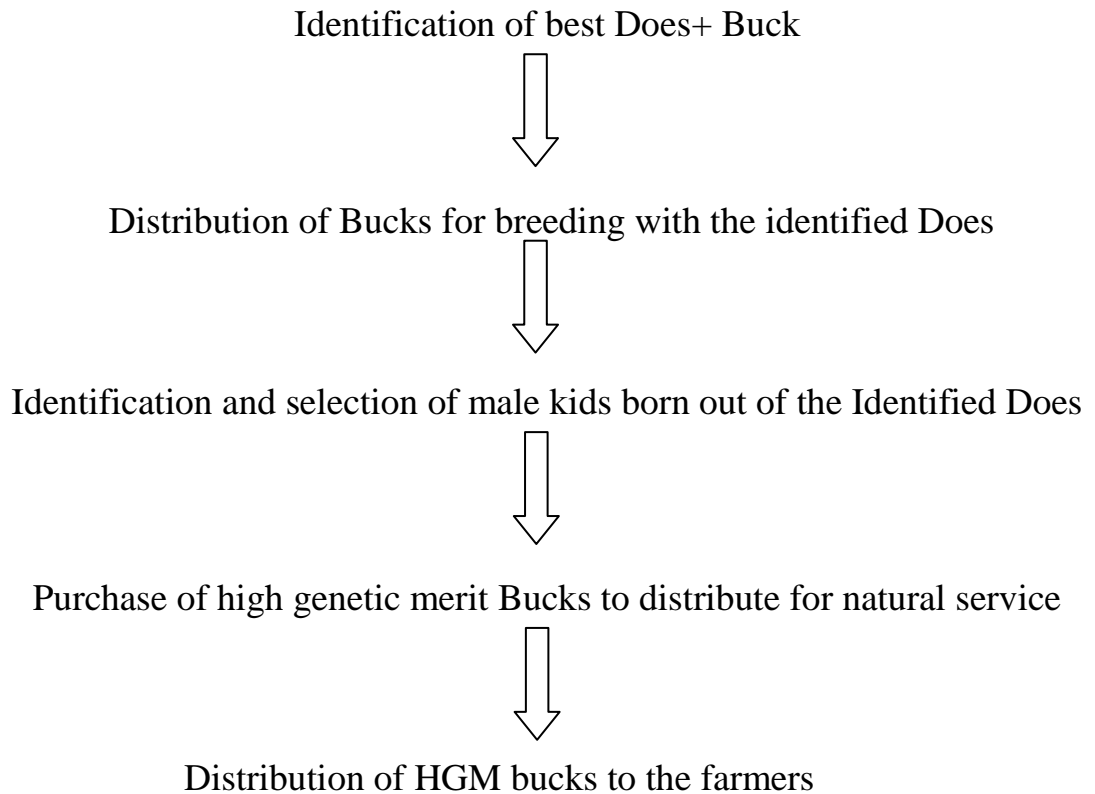
### **Suggested Action plan**

The action plan for Goat breed improvement would firstly involve identification of the herd population of high genetic merit. The broad steps and the process to do this, would comprise:

- i. An exhibition with prize money for does with good phenotype will be conducted. The number of does identified should be at least 3 times more than the number of bucks required to cover the earmarked breedable female population of the selected districts (zone). The name and address of the owner of the does shall be taken and recorded to facilitate the skilled recorder to record the traits of the male kids thus given birth by such does.
- ii. Simultaneously, the required number of bucks with good vigour and phenotype will be identified and purchased by Government for breeding with the identified does. The number of such bucks shall be at a ratio of 1 buck per 30 identified does.
- iii. Male kids born out of the identified does and having satisfactory growth rate and preferably out of twinning kids will be identified; records will be collected till 9 months of age at the farmer's house itself. Recorded data shall be sent to Central Institute for Research on Goats (CIRG), Makhdum, to get the approval to purchase the bucks for breeding. Recording of traits will be done by entrusted persons @ Rs.5000/-per month.
- iv. Following recommendations from the CIRG, Makhdum, the selected high genetic merit bucks will be purchased @ Rs.30,000/- and distributed to progressive farmers in the ratio of Buck: Doe=1:30. An agreement that they cannot sell off the bucks till 5 year and they have to allow to breed the nearby females of the villager by taking Rs. 50/- per service for looking after the buck shall be made. Any additional amount over the above purchase price for the buck shall have to be borne by the States, if required.

- v. All the identified as well as selected animals will be insured and ear tagged.

The flow chart for the above activities is as follows:



**9.3.2 To meet the increased consumption demand of Chevon and Goat Milk, the following are the key strategies**

- i. Increasing the High Genetic merit Population by way of introduction of Artificial Insemination, ETT and other modern breeding techniques.

**Suggested Action Plan**

- i. Establishment of Germplasm centres and Strengthening of AI centres and establishment of more mobile AI.

**9.3.3 Organization of Goat Farming sector and Development of Agri-preneurship**

The Entrepreneurship in the Goat farming can be increased by several folds through different Livestock Farmers Groups/Breeder's Association suggested to be in line

with ATMA farmer groups with 20 farmers in each group. Also, one of the main goal of Goat production is to increase the export of Chevon. To tap the international Markets, we need to keep the Sanitary and Phyto-Sanitary requirements of the country, wherein “traceability “of the animal product is mandatory. So, these commodity based/farming based groups will help for the co-ordination of tagging and other identification procedures. These groups will also help for the co-ordination of the marketing and value addition of the products as well as the animals.

- i. Encouragement to form 17725 Livestock Farmers Groups/Breeder’s Association over 5 years.
- ii. More leverage to be given to funding of entrepreneurs through Entrepreneurship Development and Employment Generation component of the National Livestock Mission.

### **Suggested Action Plan**

Under the National Livestock Mission, sub-mission on skill development, technology transfer and extension 7.4.1 Component (I) - IEC Support for Livestock Extension Component (III)-Livestock Farmers Groups/Breeder’s Association.

## **10. Conclusion**

This National Action Plan would serve as a basis to the States and UTs to develop their own Action Plans based on the agro climatic conditions. Accordingly, Department can formulate different modules specific to states in an integrated mode which could make an ultimate growth and sectoral development, invariably contributes to the National and Farmers income.

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**National Action Plan for Goat-Expected Outcome-Milk**

Sl No	State	Expected kiddings in a year@50 % success rate in AI.	Expected number of Goat in-milk/year	Expected Milk Prodн. @115k g/animal/lactation, in kgs
			Total	
1	Rajasthan	17406000	17406000	2001690000
2	Jammu & Kashmir	5835000	5835000	671025000
3	Uttar Pradesh	11202000	11202000	1288230000
4	Karnataka	4369000	4369000	502435000
5	Andhra Pradesh	4007000	4007000	460805000
6	Telangana	2864000	2864000	329360000
7	Bihar	4369000	4369000	502435000
8	Madhya Pradesh	5995000	5995000	689425000
9	Maharashtra	6536000	6536000	751640000
10	Odisha	4211000	4211000	484265000
11	West Bengal	7089000	7089000	815235000
Total		73883000	73883000	8496545000

8496545

8.2 million MT

Technical Assumptions

1 milk yield/doe /lactation-110 kg

## National Action Plan -Goat

### Present Production

Sl No	Production	2015-16	CAGR%
1	Chevon	9.4 lac tons	
2	Goat Milk	5.4 Million Tons	

### Targets of production and requirements by 2022

1	Chevon	12.6 lac tons	5
2	Goat Milk	8.2 MT	7

### Expected outcomes by NAP

1	Chevon	13.9 Lac tons	
2	Goat Milk	8.2 MT	

**Assumptions made for population projections of Goat.**

<b>Inputs</b>	<b>Rates</b>
Initial Number	36941256
Initial Number of Bucks	14107392
Kidding rate per year	1.5
No. of kiddings every 2 years	3
Proportion of young buck:young ewe	50%(50:50)
Proportion of does delivering triplets	10%
Proportion of does delivering twinnings	60%
Proportion of does delivering single kids	30%
Death Rate (%/year)	10%
Bucks death rate per year	1%

Fatten/Slaugther rate (%/year) for does	20%
Fatten/Slaugther rate (%/year) for bucks	70%
Average Culling Rate (%/Year)	10%
Dressing Percentage	50%
Average Body weight	50 kg



**Population Projections for Goat.**

<b>Year</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>Breeding</b>							
Does	36941256	36,941,256	80,029,537	123,117,818	#####	#####	#####
Bucks	14107392	12,696,653	27,585,093	40,984,689	71,891,140	#####	#####
<b>Kids for breeding</b>							
young does(0-12 months)		43,088,281	43,088,281	93,346,452	#####	#####	#####
Does (12 + months)		-	43,088,281	43,088,281	93,346,452	#####	#####
young bucks(0-12 months)		16,158,105	16,158,105	35,004,919	53,851,734	#####	#####
Bucks (12 + months)		-	16,158,105	16,158,105	35,004,919	#####	#####
<b>Total Kiddings</b>		#####	132,988,522	288,106,333	#####	#####	#####
<b>Total Kids</b>		#####	<b>132,988,522</b>	<b>288,106,333</b>	#####	#####	#####
Triplets		22164754	22164754	48017722	73870691	#####	#####
Twinings		88659014	88659014	192070889	295482763	#####	#####
Single		22164754	22164754	48017722	73870691	#####	#####
<b>Deserviced does</b>						#####	#####
<b>Deserviced bucks</b>							
<b>Dead Goats</b>		<b>13,298,852</b>	<b>13,298,852</b>	<b>28,810,633</b>	<b>44,322,414</b>	#####	#####
<b>Culled goats</b>		<b>11,968,967</b>	<b>11,968,967</b>	<b>25,929,570</b>	<b>39,890,173</b>	#####	#####
young ewes		10,772,070	10,772,070	23,336,613	35,901,156	#####	#####
young bucks		37,702,246	37,702,246	81,678,145	#####	#####	#####
<b>Total goats fattened</b>		<b>48,474,316</b>	<b>48,474,316</b>	<b>105,014,758</b>	#####	#####	#####
<b>Culled stocks ready for</b>			<b>11,968,967</b>	<b>11,968,967</b>	<b>25,929,570</b>	#####	#####
<b>Total goats for</b>			<b>60,443,283</b>	<b>60,443,283</b>	#####	#####	#####
<b>Total Meat</b>				664,876,114	#####	#####	#####
<b>Total Meat Production over 5 years(kgs)</b>				14,032,845,899		(14032845 tons)	

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(14 LAC TONS)





<b>Total Population in the State</b>			
<b>Total</b>	<b>Male</b>	<b>Female</b>	<b>Total</b>
8395596	4260136	17405803	21665939
695390	2308025	5835316	8143341
2779820	4383682	11201933	15585615
2554189	2212008	4369441	6581449
293860	2200780	6870441	9071221
2554189	2212008	4369441	6581449
168177	2018974	5994962	8013936
2311228	1899773	6535534	8435307
1510545	2301953	4211134	6513087
10737727	4417444	7088506	11505950
	28214783	73882511	

**National Action Plan for Goat**

SI No	State	No. of Districts	Total Population in the States				Expected Physical		cost of buck @10,000 Rs. per animal, in lacs.
			Male	Female	Breedable male@50 %	Breedable Female@ 50%	No of bucks required to achieve the target @ 50% success rate @50% slaughter rate	No of bucks in each station@ 1 semen station/district	
1	Rajasthan	33	4260136	17405803	2130068	8702902	17406	527	52.75
2	TamilNadu	32	2308025	5835316	1154013	2917658	5835	182	18.23
3	Uttar Pradesh	75	4383682	11201933	2191841	5600967	11202	149	14.94
4	Jharkhand	24	2212008	4369441	1106004	2184721	4369	182	18.20
5	Andhra Pradesh	13	1283495	4006841	641747.4	2003421	4007	308	30.82
6	Telangana	31	917285.1	2863600	458642.6	1431800	2864	92	9.24
7	Bihar	38	2212008	4369441	1106004	2184721	4369	115	11.50
8	Madhya Pradesh	51	2018974	5994962	1009487	2997481	5995	118	11.75
9	Maharashtra	36	1899773	6535534	949886.5	3267767	6536	182	18.16
10	Odisha	30	2301953	4211134	1150977	2105567	4211	140	14.04
11	West Bengal	23	4417444	7088506	2208722	3544253	7089	308	30.82
<b>Total</b>		<b>386</b>	<b>28214783</b>	<b>73882511</b>	<b>14107392</b>	<b>36941256</b>	<b>73883</b>	<b>191</b>	<b>19.14</b>

**Technical Assumptions**

- 1 Dressing percentage= 50
- 2 70% of male and 20 % of female kids born are slaughtering for Chevon production.
- 3 At present meat yield / animal is 11.5 kg(BAHS 2016)
- 4 With the improved Breeding Programme, expected average meat yield =25 kg
- 5 average milk yield/animal/lactation-98 kg

<b>Expected Expenditure</b>		
<b>Establishment of Semen Station@ 122lakhs @1/district</b>	<b>Total Project Cost in lacs.</b>	<b>Gol share @60%,in lacs.</b>
4026	4078.75	2447.25
3904	3922.23	2353.34
9150	9164.94	5498.96
2928	2946.20	1767.72
1586	1616.82	970.09
3782	3791.24	2274.74
4636	4647.50	2788.50
6222	6233.75	3740.25
4392	4410.16	2646.09
3660	3674.04	2204.42
2806	2836.82	1702.09
<b>47092</b>	<b>47111.14</b>	<b>28266.68</b>

<b>National Action Plan for Goat -Expected Outcome-Chevon</b>					
SI No	State	Expected No. of animals for			Expected Chevon
		Male	Female	Total	
1	Rajasthan	10965780	2193156	13158936	3.29E+08
2	Jammu & Kashmir	3676050	735210	4411260	1.1E+08
3	Uttar Pradesh	7057260	1411452	8468712	2.12E+08
4	Karnataka	2752470	550494	3302964	82574100
5	Andhra Pradesh	2524410	504882	3029292	75732300
6	Telangana	1804320	360864	2165184	54129600
7	Bihar	2752470	550494	3302964	82574100
8	Madhya P	3776850	755370	4532220	1.13E+08
9	Maharash	4117680	823536	4941216	1.24E+08
10	Odisha	2652930	530586	3183516	79587900
11	West Ben	4466070	893214	5359284	1.34E+08
<b>Total</b>		<b>46546290</b>	<b>9309258</b>	<b>55855548</b>	<b>1.4E+09</b>

**Technical Assumptions**

1396388.7 tons

- 1 Dressing percentage= 5
- 2 70% of male and 20 % of female lambs born are slaughtering for mutton production.
- 3 meat yield / animal is 25 kg

### National Action Plan for Goat -Expected Outcomes(through Artificial Insemination)

Sl No	State	No. of Districts	No of bucks required to achieve the target @ 50%	Expected kiddings in a year@50% success rate in AI.	Expected No of kids			Totalkids expected	Expected No of lambs @50% of total lambs
					single@30%	twinning@60%	triplets@10%		
1	Rajasthan	33	17406	17406000	5221800	20887200	5221800	31330800	15665400
2	Jammu & Kashmir	32	5835	5835000	1750500	7002000	1750500	10503000	5251500
3	Uttar Pradesh	75	11202	11202000	3360600	13442400	3360600	20163600	10081800
4	Karnataka	24	4369	4369000	1310700	5242800	1310700	7864200	3932100
5	Andhra Pradesh	13	4007	4007000	1202100	4808400	1202100	7212600	3606300
6	Telangana	31	2864	2864000	859200	3436800	859200	5155200	2577600
7	Bihar	38	4369	4369000	1310700	5242800	1310700	7864200	3932100
8	Madhya Pradesh	51	<b>5995</b>	5995000	1798500	7194000	1798500	10791000	5395500
9	Maharashtra	<b>36</b>	6536	6536000	1960800	7843200	1960800	11764800	5882400
10	Odisha	30	4211	4211000	1263300	5053200	1263300	7579800	3789900
11	West Bengal	23	7089	7089000	2126700	8506800	2126700	12760200	6380100
<b>Total</b>		<b>386</b>	<b>73883</b>	<b>73883000</b>	<b>22164900</b>	<b>88659600</b>	<b>22164900</b>	<b>132989400</b>	<b>66494700</b>

#### Technical Assumptions

- 1 Semen produced from 1 Ram/year = 2000 doses
- 2 AI success rate= 50%
- 3 Ratio of single kid: twinning: triplets =30:60:10
- 4 Ratio of male:female kids =50:50
- 5 70% of male and 20 % of female lambs born are slaughtered for mutton production.
- 6 30% of male and 80% female lams are retained for breeding purpose.

al Insemination)

o of Males		Expected No of Females		
Bucks required for slaughteri ng@70%	Bucks required for breeding@ 30%	Total @50% of total kids	Does required for slaughteri ng@20%	Does required for breeding@ 80%
10965780	4699620	15665400	3133080	12532320
3676050	1575450	5251500	1050300	4201200
7057260	3024540	10081800	2016360	8065440
2752470	1179630	3932100	786420	3145680
2524410	1081890	3606300	721260	2885040
1804320	773280	2577600	515520	2062080
2752470	1179630	3932100	786420	3145680
3776850	1618650	5395500	1079100	4316400
4117680	1764720	5882400	1176480	4705920
2652930	1136970	3789900	757980	3031920
4466070	1914030	6380100	1276020	5104080
<b>46546290</b>	<b>19948410</b>	<b>66494700</b>	<b>13298940</b>	<b>53195760</b>