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Rabbit Farming in India: An Overview

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ABSTRACT

Domestic rabbit belongs to genus *Oryctolagus cuniculus* which has 38 important breeds and 77 varieties of European rabbits. The domestic rabbit is known to produce quality meat, fur and very fine quality animal fibre. Rabbit rearing has gained momentum in the recent years among the developing countries including India, owing to their small body size, rapid growth rate, high prolificacy, early maturity, shorter generation interval and ability to utilize forage and fibrous agricultural by-products. In India, there has been a rising awareness in recent years on the virtues of broiler rabbit production as an alternative means of alleviating food shortages. India is also one of the developing countries which are also facing meat shortage of 4.66 g/day against the recommended requirement of 87 g/day. In India, the total rabbit population has increased from 424 thousands in 2007 to 591.6 thousand in 2012 which is 39.55% increase in last 5 years.

Key words: Diseases, Economics, Meat demand, Opportunities, Rabbit.

Rabbits are becoming increasingly popular as an additional source of animal protein to meet the increasing demand from the ever-growing human population. Rabbit rearing gained momentum in the recent past owing to their high prolificacy, early maturity, shorter generation interval and efficiency in feed utilisation. In developing countries, it has been realised that domestic rabbit is an important livestock species which has immense potential to improve the socio-economic status of the rural poor (Risam *et al*., 2005). Domestic rabbits (*Oryctolagus cuniculus*) are ubiquitous, providing protein, fibre, research models and companionship. Rabbits have high reproductive potential and fast growth rate (Hassan *et al*., 2012), utilize low grain and high roughage diets and breed all year-round. Other attributes are short gestation period, early sexual maturity, ability to rebreed shortly after kindling and short generation interval. These qualities confer rabbits a potential to bridge the shortage of animal protein in developing countries (Ghosh *et al.,* 2008). The rabbit meat has a high percentage of easily digestible protein and it contains less amount of fat among all other available meats. Rabbit meat contains less calorie value and it contains less amount of cholesterol (56.4 mg/100 g meat) and therefore it is heart patient friendly diet. The sodium content of rabbit meat is comparatively less than other meats. The calcium and phosphorus content of this meat is more than any other meats. Rabbit meat with many health benefits does not have a strong flavour and is comparable to chicken but not identical.

Demand for rabbit production in India

In India, there has been a rising awareness in recent years on broiler rabbit production as an alternative means of alleviating food shortages. India is also one of the developing countries which is also facing meat shortage. The percapita availability of meat in India is 4.66g/ day against the recommended level of 87g/ day (Kumar *et al.,* 2014). In India, other than standardized farms, numerous farmers are rearing rabbit in backyard which will help them in providing meat for their families as well as self-employment for them. There is a great demand among unemployed educated youth for starting rabbit farming as an alternate means of employment and entrepreneurship.

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Rabbit meat production at world level

According to FAO (2013), the estimated world rabbit meat production has been 1.2 to 1.8 million tonnes and only three European countries France, Italy and Spain are producing one billion kilogram of rabbit meat. China produces 0.6 million tonnes, Italy- 0.23 million tonnes, Spain and Egypt- 0.07 million tonnes each and France-0.055 million tonnes. Some of the developing countries like Brazil, Mexico, Cuba, Ghanas, Mozambique, Peru, Egypt, Nigeria and Sudan have popular rabbitry programmes for rabbit meat. Beside USA, Germany, Russia, Malta and Belgium are the major rabbit meat producing countries. China is the biggest importer of angora wool (about 40 tonnes per year). Of the total world

population of rabbit, major population is confined to the temperate zone of European countries, Russia, United Kingdom and United States of America.

Rabbit population and status in India and Tamil Nadu

In India, the total rabbit population has increased from 424 thousand in 2007 to 591.6 thousand in 2012 which is around 39.55% increase in 5 years.

1. Meat production

In India, rabbitry is still in offing stage (except in Himachal Pradesh and Jammu and Kashmir) and has not gained a firm foothold. Few states like Tamil Nadu, Rajasthan, Karnataka and Andhra Pradesh have a large scale rabbitry for broiler production. In order to popularize and boost up rabbitry in the country, Russian angora was imported by ICAR in November, 1979. Later on, British Angora rabbit were also imported at Garsa Division of Himachal Pradesh for fur and wool production in 1980.

2. Meat quality

Rabbit meat is rich in calcium (21.4 mg/100 g) and phosphorus (347 mg/100 g) and lower in fat (9.2 g/100 g) and cholesterol (56.4 mg/100 g) than other types of meat. Beef contain highest cholesterol content (114.5 mg/100 g), almost double as that of rabbit meat, while pork is also rich in fat (28.2 g/100 g). Rabbit meat with high protein and low fat is healthier (Table 1) than other meats (Nistor *et al.,* 2013).

3. Wool production

Commercial rabbit farming has been taken up and established in private sectors with German Angora breed in Kullu valley, Garsa of Himachal Pradesh as well as Garhwali Hills of Uttarakhand, as it is very popular in these regions.

4. Fur production

Jammu and Kashmir has a very thriving domestic fur industry. About 25 lakhs of fur skin are imported every year. The fur industry in India utilizes about 5 lakhs rabbit fur skin per year mostly from France. Rabbits contribute almost 50% of the fur skin trade in international market. About 50 to 60 marketable rabbits are produced annually by a single doe in advanced countries.

5. Rabbit breeding research in India

Research on rabbits for wool and meat production was initially started at Garsa (H.P) in 1978 having cool climate conducive to their production. Later on five important exotic breeds of rabbits such as Angora for wool and Soviet Chinchilla, New Zealand White, White Giant and Grey Giant for meat were introduced in semi-arid region at CSWRI, Avikanagar (Rajasthan) in the year 1982. The production performance of these rabbits maintained under two apparently opposite climatic conditions being found promising the research on rabbit meat production which was started in the year 1986. Thus, further rabbit production schemes were initiated and intensified in different states of the country with distribution of over 5000 rabbits by mid-eighties. A rabbit breeding research scheme for meat was also started during late eighties at Ranchi Veterinary College, Kanke, Ranchi (Jharkhand). Rabbits are also maintained

Table 1: Nutritional values of meat products.

Animal	Protein (%)	Fat (%)	Moisture (%)	Calories /lb
Rabbit	20.8	10.2	67.8	795
Chicken	20.0	11	72.6	810
Veal	19.1	12	68	840
Beef	16.3	28	55	1440
Pork	11.9	45	42	2050
Lamb	16.7	27.7	55.8	1420

Source: Lane (1999).

Table 2A: Rabbit population (19th Livestock Census, 2012) in India.

State/UT	Population (in No's)	Rank
Kerala	230550	1
Tamil Nadu	52915	2
Nagaland	44227	3
Andhra Pradesh	36792	4
West Bengal	32584	5
Uttar Pradesh	31918	6
Karnataka	23558	7
Bihar	18762	8
Rajasthan	13542	9
Haryana	13107	10

Table 2B: Broiler rabbit production scenario in southern India (19th Livestock Census, 2012).

States	Rabbit population as on 2012	Total population in India (%)	Approximate number of farms as on 2016
Kerala	2,30,550	38.96	23 Govt. farms; Hundreds of farmers and women self help groups rearing 10 to 20 units of rabbits under backyard all over Kerala + 150 small private farms.
Tamil Nadu	52,915	8.94	4 Govt. farms + 250 small private farms
Karnataka	23,558	3.98	7 Govt. farms + 150 small private farms
Andhra Pradesh	36,792	6.22	3 Govt. farms + 50 small private farms
Pondicherry	1,593	1.2	1 KVK Unit + 10 small private farms
Total		59.3	

(Table 2A) at Southern Regional Research Centre (CSWRI) at Mannavanur, Kodaikanal, Tamil Nadu.

Tamil Nadu and Kerala contribute about 47.9 percentage of broiler rabbit population in southern part of India (Table 2B).

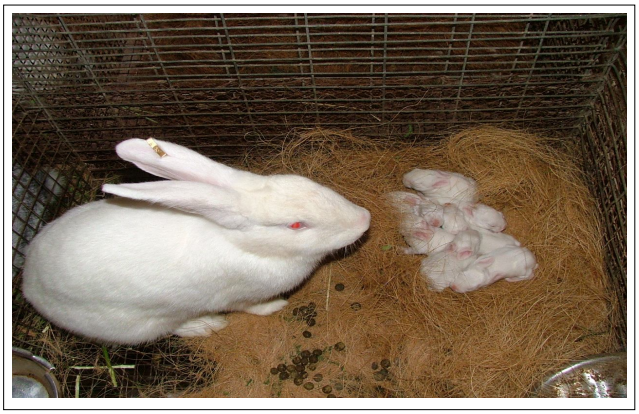
Common breeds of rabbits in India

1. Soviet Chinchilla

This breed is blue grey in colour with a white belly. It has a characteristic 'raff' or 'dewlap'. It is a thick fold of skin around the front of chest, which is very obvious when the rabbit is in good condition. Matured body weight is 3-4.5 kg. Although this breed is reared for meat, its fur is a fancy in fur crafts.

2. White Giant

White Giant is white coloured rabbit. It is a larger rabbit known for its prolificacy and fast growth.



3. New Zealand White

This breed was evolved in England. Fur is white and skin is albino. The eye colour is red due to the absence of melanin pigment. Adult weight is 4.5 to 5.0 kg. Meat and fur skin are the main product of this breed. This breed is the one used most widely throughout the world for meat production.

Reproduction

Sex ratio : 1:10 (1 male for 10 females).

Age at which first bred: Small breeds-4 months of age (Polish, Dutch) Medium breeds-5-6 months (New Zealand White, Chinchilla)

Induced ovulator : A female rabbit appears to have no definite estrus cycle, although a certain rhythm exists in their sexual receptivity.

Signs of heat :
1. Restlessness, rubbing the chin on the sides of the cage.
2. Lying in mating posture, lifting the tail.
3. Congested purple and moist vulva.

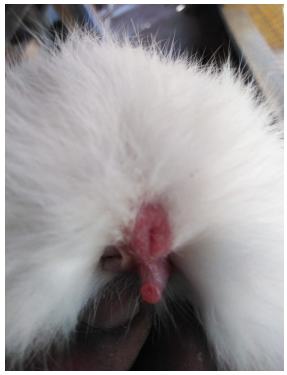
Selection for breeding

When the rabbit reach 4 to 5 months of age, the breeding stock can be selected. The following points should be considered.

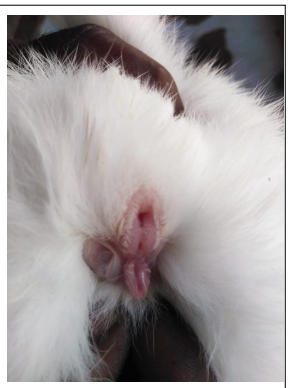
1. Select the heaviest animal but take account of any difference in age.
2. The rabbit should be selected from the largest litter.
3. Healthy animal should be selected for breeding purpose. A healthy rabbit will have normal eating and drinking habit. It is always alert and having curiosity in searching the cage. Similarly a healthy rabbit will groom its body regularly and the fur will be smooth and shiny.
4. Males should be selected on the basis of the above and in addition they should be checked to confirm that each has two testicles in its scrotum. The testicle descends from the body cavity into the scrotum at around 12 weeks.

Induced ovulator

A female rabbit is therefore considered to be in heat when she accepts service. A red vulva is a strong indication of heat. A doe in heat assume a characteristic pose called "lordosis", with the back arched downward and hind quarters raised. A doe in dis-oestrus tends to crouch in a corner of the cage or exhibit aggression towards the buck. Soviet Chinchilla were mated 10 days earlier than the White Giant.



Male



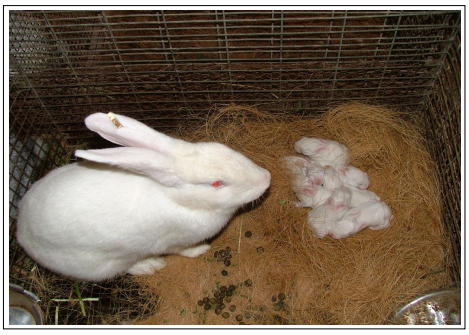
Female

The production performance of White Giant and Soviet Chinchilla rabbits maintained at Namakkal is given in Table 3.

The winter season yielded more beneficial values for rabbit performance in a sub-temperate climate, whereas

Table 3: Performance of White Giant and Soviet Chinchilla rabbit at VCRI, Namakkal.

Breed (number of observations)	Litter size at birth	Litter size at weaning	Litter weight at birth (g)	Average weight of kit at birth (g)	Litter weight at weaning (g)	Average weight of kit at weaning (g)	Pre-weaning growth rate (g/d)
Soviet Chinchilla (377)	5.1	3.7	256.4	50.4	2,567.8	694	15.3
White Giant (354)	5.1	4.1	259.6	50.8	2,517.4	614	13.4



summer temperature as well as heavy rainfall led to significant reduction (P<0.01) in average daily gain (Table 3). Perhaps this is a reflection of the effect of season of kindling on milk production. The difference associated with the kindling season can be attributed to the prevalent environmental conditions and stress factors affecting feed intake. The period of birth had significant effects as that of body weight traits (Sakthivel *et al.,* 2015).

Growth performance

The mean weekly body weight showed significant difference between breeds continuously in the growing period from 7th to 15th week except 12th week (Table 4). Throughout the period Soviet Chinchilla rabbits were found heavier than White Giant rabbits.

Table 4: Mean weekly body weight (g) in White Giant and Soviet Chinchilla (Bharathy *et al*., 2010).

Age in weeks	Breeds	Mean weight (g)
7	White Giant	937.87
	Soviet Chinchilla	1045.18
8	White Giant	1113.18
	Soviet Chinchilla	1215.06
9	White Giant	1280.43
	Soviet Chinchilla	1368.56
10	White Giant	1384.62
	Soviet Chinchilla	1482.75
11	White Giant	1535.50
	Soviet Chinchilla	1619.31
12	White Giant	1696.40
	Soviet Chinchilla	1783.68
13	White Giant	1859.93
	Soviet Chinchilla	1937.31
14	White Giant	1931.43
	Soviet Chinchilla	2065.68
15	White Giant	2045.56
	Soviet Chinchilla	2132.62

Common disease problems encountered in rabbits

1. Coccidiosis

This disease was probably responsible for more loss through deaths and lowered production than any other diseases. It is caused by several species of protozoa of the genus Eimeria, one species attacking the liver, the other attacking the intestines. Very often a mixed infection occurs.

The symptoms vary according to the form of the disease, the age and severity of attack and also the condition of the animal. Diarrhoea is occasionally present in case of hepatic (liver) form of coccidiosis and there is loss of body condition. The liver, in advanced cases, shows a number of white or yellow spots or streaks and later, nodules, the contents of which vary from the thin fluid to a thick cheesy material. The bileduct become thickened and in advanced chronic cases of the liver form, the liver is greatly enlarged, giving rise to 'pot-belly' in life.

In the intestinal form, the signs are more varied, there is usually loss of flesh, the coat becomes harsh and staring. Infection arises from contaminated food and water. Adult animals act as a carrier of the disease.

Treatment: Sulphaquinoxaline (1 gm per liter of water), Sulphadimidine, Nitrofurazone.

2. Ear and skin mange (ear canker)

It is a common disease of rabbit. It is caused by one of two types of mite, usually *Psoroptes cuniculi* but sometimes *Chorioptes cuniculi.* The adult mites are about 0.5 mm long and can be seen in scrapings from an affected ear. The mites attack the inside of the ear and cause inflammation of severe irritation, yellow or brown scab being produce. The rabbit scratches its ear and shakes its head constantly. Infestation occurs by the transmission of mites from one animal to other and the condition is very contagious. The mites can live up to three or four weeks away from a rabbit unit. In advanced stage, it may affect the middle ear causing wry neck (the rabbit's head is held constantly to one side).

Treatment can be effective if attended at an early stage. The ears of rabbits should be cleaned periodically with organo-phosphorous compound or with Butox (Deltametherins). The culling of rabbit with excessive mange is advisable.

The bedding of affected animal should be burned and hutch carefully disinfected. The old form of treatment, which is still effective, consist of removing all crusts or scabs with cotton wool wrapped round a thin stick and dipped in

hydrogen peroxide or sprit. After the removal of the scab of the proprietary ear canker preparation should be applied or liquid paraffin containing 1% phenol, or any benzyl benzoate preparation can be used.

Modern treatment consists of the subcutaneous injection of Ivermectin at the rate of 400 micro gram per kg of live weight of the animal. One of the benefits of this treatment is that other parasites which exist are also dealt with at the same time. The treatment does not kill the eggs of the mite and should therefore be repeated three weeks later.

Economics of rabbit production (50 Doe + 10 Buck - One year)

Assumptions

1. A unit of 10 males and 50 female rabbits are purchased preferably at breeding age at a cost of Rs. 500/rabbit.
2. Floor space required is 2 sq.ft/ buck and doe, 1.0 sq.ft/ grower and 4.5 sq.ft/ kindling cage under cage system at a cost of cage is taken Rs. 250/sq.ft.
3. Total area required for construction of low cost rabbit shed is Rs. 600/sq.ft. The cost of construction of shed is taken @ Rs. 300/sq.ft. Total number of kindling cages required is 20.
4. Total number of young ones produced from the parent stock (50 doe + 10 buck) is 1000 per year considering average litter size of 5 with four kindling in a year/doe.
5. Cost of equipment is taken Rs. 100/adult animal (60 numbers) and Rs.100/ grower (For 250 numbers).
6. Depreciation of shed and equipment is taken at 15% and 20% per annum, respectively.
7. Interest on total fixed investment @ 12 per cent/ year.
8. Since animals are reared under intensive system, each animal will be fed with 125 g of Concentrate for adult and 50 gm for fryers up to market age (3 months). Cost of one kg of adult concentrate feed @ Rs. 20.00/- (Concentrate feed own mix).
9. Green fodder will be fed @250/adult and @100 gm for fryers. Cost of green fodder Rs. 2.0/kg (Own cultivation).
10. Veterinary charges alone is accounted at the rate of Rs 25/adult/year and @ Rs. 5/bunny calculate for 90 days.
11. The family labour (Male/Female) will be employed.
12. In total 1000bunnies is estimated to be obtained per year and will be sold at Rs. 350/rabbit (3 ½ months of age with 2.0 kg body weight @ Rs. 350/animal).

I Fixed investment	**Amount in rupees**
1. Cost of construction of low cost rabbit shed (600 sq.ft.@ Rs. 300/sq.ft)	1,80,000
2. Cost of cages for breeding stock, grower and kindling cages (120 sq.ft for breeder, 250 for grower and 90 sq.ft for kindling cage, totally 460 sq.ft × Rs. 250/ sq.ft)	1,15,000
3. Cost of breeding stock (10 bucks + 50 does) @ Rs. 500/animal	30,000
4. Cost of equipment @Rs. 100/adult animal (60 numbers) and Rs. 100/grower (For 250 numbers)	31,000
Total fixed investment	**3,56,000**
II Fixed cost	
1. Interest on fixed investment @ 12%/annum for one year	42,720
2. Depreciation on building @ 15%/annum for one year	27,000
3. Depreciation on equipment @ 20%/annum	29,200
Total fixed cost	**98,920**
III Variable cost	
1. Cost of concentrate feed for adult @ 125 gm /day (60 × 0.125kg × Rs. 20 × 365 days)	54,750
2. Cost of concentrate feed for fryer rabbits @ 50 gm/day (1000 × 0.05 kg × Rs. 20 × 90 days)	90,000
3. Cost of green fodder for adult @ 250 gm/ day (60 × 0.25 kg × Rs. 2.0 × 365 days)	10,950
4. Cost of green fodder for fryer rabbits @ 100gm /day (1000 × 0.1 kg × Rs. 2.0 × 90 days)	18,000
5. Veterinary charges @ Rs. 25/animal/year (60 adults) and @ Rs. 5/bunnies calculated for 90 days (1000 growers)	6,500
Total variable cost	**1,80,200**
IV Total cost (II + III)	**2,79,120**
V Returns	
1. Sale of 1000 young ones per year @ Rs. 350/rabbit	3,50,000
2. Value of manure and gunny bags	5000
Total returns	**3,55,000**
VI Net returns for one year (V-IV)	**75,880**
Net returns per month	**6323**
Cost benefit ratio	**1:1.27**

Challenges in rabbit farming

1. Unavailability of rabbit feeds. Due to small number of rabbits raised by smallholder farmers, commercial rabbit feeds are not available in all places.
2. Poor housing and sanitation.
3. Lack of access to credit and government support.
4. Health care inadequacies and inadequate supply of breeding stock
5. Frequent mange mite infestation and mortality.
6. Rabbits are considered as pet animals and not used for meat purpose.

Opportunities

1. Market for rabbits is available and broad.
2. Backyard gardening, which is supported by government as a poverty eradication strategy provides an opportunity for rabbit farming to be integrated into the farming system to enable utilization of garden wastes. Rabbits are efficient in turning garden and kitchen wastes into high quality protein.

Additionally, rabbit manure can be used as a fertilizer in gardens and orchards.

Financial support

National Livestock Mission is an initiative of the Ministry of Agriculture and Farmers' Welfare implemented with the objective of sustainable development of the livestock sector. NABARD is the subsidy channelizing agency under Entrepreneurship Development and Employment Generation (EDEG) component of National Livestock Mission. This includes "Integrated Development of Small Ruminants and Rabbit (IDSRR)".

REFERENCES

19th Livestock Census, (2012). All India Report, Ministry of Agriculture, Department of Animal Husbandry, dairying and fisheries, Krishi Bhawan, New Delhi.

Bharathy, N., Ramesh, V., Ramesh Saravana Kumar, V., Devendran, P. and Sivakumar, K. (2010). Growth performance of broiler rabbits under different systems of housing. Indian Journal of Small Ruminants. 17(1): 88-94.

FAO, (2013). http://faostat3.fao.org/home/index.html#METADATA.

Ghosh, S.K., Das, A., Bujarbaruah, K.M., Das, A., Dhiman, K.R. and Singh, N.P. (2008). Effect of breed and season on rabbit production under subtropical climate. World Rabbit Sci. 16: 29-33.

Hassan, H.E., Elamin, K.M., Yousif, I.A., Musa, A.M. and Elkhairey, M.A. (2012). Evaluation of body weight and some morphometric traits at various ages in local rabbits of Sudan. J. Anim. Sci Adv. 2(4): 407-415.

Kumar, D.S., Ekhath, B. Chakurkar and Singh, N.P. (2014). Rabbit as an Alternative source of Meat production. www.icargoa.res.in, Indian Council of Agricultural Research (ICAR), Technical Bulletin. 45: 1-51.

Lane, T.J. (1999). Rabbit Production in Florida.Fact Sheet VM-51. Cooperative Extension Service, University of Florida. http://hammock.ifas.ufl.edu

Nistor E., Bampidis, V.A., Pafcalaf, N., Pentea, M., Tozer, J., Prundeanu, H. (2013). Nutrient content of rabbit meat as compared to chicken, beef and pork meat. J. Anim. Prod. Adv. 3(4): 172-176.

Risam, K.S., Das, G.K., Bhasin, V. (2005). Rabbit for meat and wool production in India: A review. The Indian Journal of Animal Sciences. 75(3): 365-382.

Sakthivel, M., Balasubramanyam, D., Gopi, H., Kumarasamy, P., Raja, A. and Anilkumar, R. (2015). Non-genetic influences on growth performance of a population of farm-bred New Zealand White rabbits. International Journal of Science, Engineering and Technology Research. 4(3): 595-598.