

Strategies for reduction of kid mortality in goats

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Goat production system in India has started slowly moving from traditional low input extensive to high input intensive commercial production system. One of the important limiting factors of goat rearing is the high level of mortality among kids, which can affect the economic viability of goat farming. The factors associated with kid mortality are age of the kid, birth weight, types of birth (single, twin, triplet), the season of birth, fodder availability, flock size, breeding system, predators and diseases (both infectious and non-infectious). The mortality of kids in goat farm varies from 16–33% depending upon the management system of the farm. The selection of females and males at proper age and weight for breeding is required for the birth of a healthy kid. Good management practices on the farm can reduce the mortality of the kids. Maintaining balanced nutrition of pregnant goats throughout the pregnancy period can ensure birth of healthy and viable kids. Proper care of newborn kids, isolation of sick animals, quarantine of newly purchased animals, sanitation, and hygienic measures of the farm can reduce infection of the pregnant goats and kids. A good shelter condition is required for the kids in different seasons to reduce mortality. Vaccination of pregnant goats against infectious diseases can reduce kid mortality as immunity will pass to kids through colostrum.

Keywords: Colostrum, Diseases, Kid, Mortality, Quarantine

GOAT kids are the most vulnerable component of a goat flock, thus every effort to safeguard their survivability can boost productivity and profitability. The biggest cause of economic loss for goat farmers is the mortality of kids before weaning, which can be reduced by better management and nutrition of the kidding flock. The survivability of newborn kids in the first few hours following birth is influenced by many factors including dam's nutrition during pregnancy, process of birth, maternal behaviour, neonatal behaviour and the physical environment at which parturition occurs. The survival of goat kids is crucial to goat farming's success; thus, their mortality and morbidity are of great concern to farmers, since they represent an irreversible loss. Neonatal kid

mortality is a principal factor in ascertaining the productivity of a goat farm and is also a sensitive index of management efficiency. Mortality of kids mainly occurs due to management errors of the farm, diseases and congenital problems. In many production systems of goat rearing, kid mortality is greater at birth and then from birth to weaning, while mortality is generally low from weaning to breeding age. Kids are most susceptible on the day they are born, up to 50% of all pre-weaning mortality occurs on that day. Newborns leave the warm and safe uterus to a difficult extra uterine environment, which can be chilly or damp, and where microorganisms may attack the newborn animal.

Incidence of kid mortality in India

Kid mortality is a major barrier

to increase in goat productivity. The kid mortality rates for small, medium and large categories of goat units were 33, 32 and 16%, respectively. The incidences of mortality varied from 41–60%, 17–38% and 23–21% in winter, rainy and summer, respectively. Depending upon the situation, mortality of kids happens to be the highest in winter followed by rainy season. There is a possibility to lose up to 30% kids born in cold and wet weather, if no proper shelter is available. Age of goats is the most important factor and is accounted for 42%, 35% and 23% mortality in 0–1 month, 1–2 month and 2–3 months, respectively (Table 1). In general, 15–20% preweaning mortality is observed in traditional goat farming.

Table 1. Reasons/causes for kid mortality

Non-infectious	Managerental	Hypothermia of kid due to very cold or wet weather when kidding
		During selection of underweight or overweight does for breeding
		Not vaccinating the dam against the infectious diseases like Colibacillosis, Enterotoxaemia etc.
		Poor sanitation and unhygienic conditions of the shed
Infectious	Nutritional	Under nutrition of dam during pregnancy
		Delay or no feeding of colostrum to kids immediately after birth
		Insufficient milk from mothers
	Protozoal	Coccidiosis, Cryptosporidiosis and Giardiasis
	Viral	Rotavirus, Coronavirus, Goat pox, and Foot and Mouth diseases
	Bacterial	Colibacillosis, Pasteurellosis, Salmonellosis and Clostridial infections

Management strategies/practices to reduce kid mortality

Feeding of doe during pregnancy

A sufficient transfer of nutrients between the placenta and mammary gland is required for the normal growth of foetus. During the last six weeks of pregnancy, a growing foetus gains around two-third of its birth weight. Therefore, proper nutrition throughout late pregnancy is important for foetal development and survival at birth. A low level of nutrition can negatively affect birth weight and early postnatal growth of kids. It also decreases the formation of mammary secretory tissue mass, which has an impact on lactation period, resulting in less colostrum and milk for the offspring, which affects growth and kid survival. Kid mortality is reduced when multiple carrying does are given additional feed in late gestation.

- Pregnant animals should be permitted to spend 4–5 hours each day in good quality pasture.
- Their ration must be supplemented with available green fodder @5–7 kg/head/day.
- A pregnant doe should be given a concentrate mixture @300–500 g/day (16% DCP and 77% TDN). For lactating goats 300–400 g of concentrate mixture/kg (15% DCP and 75% TDN) of milk produced should be given in addition to

maintenance amount of 150 g/day.

- The diet of the pregnant doe should be supplemented with minerals and vitamins.
- Grain allowance should be lowered as kidding time approaches or soon after kidding, but good quality dry roughage should be offered free choice.
- It is usually preferable to feed lightly on the day of parturition, allowing plenty of clean, cool water.
- Providing adequate nutrition, easily digestible and laxative diet to the pregnant goat must be ensured.
- A mixture of wheat bran and barley or oats or maize at 1:1 proportion is excellent.

Housing management of a pregnant doe

One should keep advanced pregnant does separated from others. Kidding sheds can be used as maternity rooms for pregnant doe to house them individually. A manager for holding feed and a bucket for keeping water should be provided in the shed (1.5 m (l) × 1.2 m (w) × 3.0 m (h)). The shed must have non-slippery floor which has clean fresh straw for bedding. In cold climates some warming device, like a room heater or heat lamp or electric bulb can be fixed in maternity pens, so that newborns are protected from

cold stress during winter.

Care of newborn kids

After birth of kid, cleaned the nostrils and removed the placental membranes sticking on the kid, by gentle rubbing with dry cotton or rags. Holding the kids up by hind legs with head downward for few seconds helps in clearing the respiratory tract. Within half an hour, the kid may stand and begin walking. Allow the doe to lick the kids until they are completely dry for the development of a bond between dam and kid. Within 30 minutes of birth, the kid should get its first colostrum for maximum absorption of immunoglobulins present in colostrum. If the kids are unable to suck, the teats should be grasped by the hand and pressed into their mouth. Kids will get the taste of milk which encourages suckling. The kids should be protected from extreme weather conditions, particularly during the first two months by providing suitable housing environment.

Importance of colostrum feeding: Colostrum is the doe's first thick yellowish milk produced after kidding. Colostrum is rich in maternal antibodies (immunoglobulins), vitamin A, minerals, fat, and other energy-rich substances. Colostrum should be given @100 ml/kg live weight. Newborn kids, especially those born in cold weather, have low energy stores and require early access to colostrum to maintain body temperature and for survival. Therefore, colostrum should be ingested very early in life as soon as possible. After the first 6–12 h of birth, the concentration of antibodies in the doe's colostrum drops rapidly. The maximum capacity of newborn kids to absorb antibodies persists for 6 h after birth, with the majority of absorptive capacity absent by 24 h of age (Table 2). So early feeding of colostrum is very important for kids survivability and future growth.

Navel dipping of kids: After the birth of kid, umbilical cord is cut with a sharp knife or scissor. The navels of all kids should be treated as soon as possible after birth. The

Table 2. Feeding schedule for kids

Age	Approximate live wt. (kg)	Milk (ml)	Quantity to be fed	
			Starter Ration (g)	Green fodder (g)
Birth to 5 days	1.5–2.0	Colostrum	-	-
5–30 days	2.0–3.0	300–500	Small quantity	Small quantity
30–60 days	3.0–5.0	400–500	50–100	Small quantity
60–90 days	5.0–7.5	350–500	100–150	ad lib.

Table 3. Deworming schedule for goats

Disease	Age group	Treatment period	Oral dose
Coccidiosis	1–6 months	Anti-coccidial drug for 5–7 days	Amprolium @50–100 mg/kg body weight. Sulphadimidine @130–200 mg/kg body weight.
Endoparasitic infection	3 months and above	Two dewormings annually (pre and post monsoon)	Fenbendazole @7.5–10 mg/kg body weight. Additional deworming may be needed in cases of heavy parasitic load.
Lice infestation	Any stage	Pre and post winter	As and when required
Tick infestation	Any stage	Monsoon	As and when required

navel cord is disinfected by dipping the end of the umbilical cord in iodine. Tincture of iodine (10%) is the preferred product whose best way to apply is using a teat dip cup to immerse the navel completely, coating all surfaces. Ideally, navels should be treated 3 times at 6 h intervals, particularly if there are problems of joint ill/navel ill on the farm. Starter ration should be palatable and easily digestible concentrate mixture with 20–24% DCP and 70% TDN.

Management of kids in different seasons

Winter: Goats kidding in the cold weather require better shelter because the thermoregulation of young kids at birth is underdeveloped and are unable to maintain their body temperature outside. The floor and bedding of the kids is kept dry using saw dust, straws, rice husk, etc. Young kids can also be provided with protective clothing to prevent heat loss from the body, providing warmth which can be made from gunny bags, sacks, blankets, etc. A heat lamp may be required in these situations but should only be used

with extreme caution because of the risk of barn fires or animals chewing electric cords. Hypothermia is a major risk for neonatal kids, and housing, feeding, and hydration are key considerations for minimizing hypothermia. Milk should be fed to kids in greater quantities for more energy supply. The number of feedings per day should be increased from two to three while maintaining the same quantity each feeding. The animals are kept indoors during harsh winters, ensuring adequate ventilation at the same time. If there are larger trees around the shed, the branches of the shady trees are chopped for enhancing the infiltration of sunlight into the animal shed. Sunlight not only warms the animal house but also disinfects it at the same time. Any fluctuation in temperature can lead to respiratory problems; therefore, a constant temperature throughout the day should be maintained. The suitable temperature range for mature goats is from 7–27°C (44–80°F) and from 13–29°C (55–84°F) for kids less than one month old. In the winter, a thermometer in the barn

helps to determine the requirement of supplemental heat, especially for young kids or kidding does.

Rainy: Dry bedding for the kids is prepared. The dry straw or animal mattresses can be used during rainy days. Before the onset of rainy season, the roof of animal shed should be made rain proof. There should be no leakage in the shed roof as it enhances moisture levels and affects comfort of animals. Water logging and floor dampness may lead to increase in ammonia levels which can cause eye infection and respiratory disorders. Wet floor may also lead to diarrhoea, fever, pneumonia, coccidiosis, hypothermia leading to death. Young kids are at higher risk of developing disease due to wet floors. Farmer should ensure that feed is free from moulds during rainy days. Feeding of mouldy feed causes digestive disorders. The kids should not be let loose outside during rainy season and should be provided with a heat source if the temperature drops down. Kids above 3 months of age should be given dewormer and should be vaccinated against infectious diseases before the rainy season.

Summer: One of the most popular technique to minimize heat stress is to change the environment to enhance the heat dissipation process. Shade, evaporative cooling with water in the form of mist, spraying of natural or forced air, and potentially cooling pools etc all are included. Ventilation of the shed is a must in hot weather to protect kids from heat stress. Cross ventilation, which brings in fresh air and removes stale air and odour is preferred. An unhygienic shed with dirty bedding invites skin rashes, lung difficulties, foot problems, and other diseases. These problems are increased in summer, and therefore the kids are kept in clean shelter as far as possible. In the summer heat, diarrhoea may quickly lead to dehydration and hence, kept a constant supply of cool, clean water available for drinking. Persistent diarrhoea in young kids can lead to death, if left untreated, therefore veterinarian must be consulted in

Table 4. Vaccination schedule for goat kids

Disease	Primary vaccination		Oral dose
	First injection	Booster injection	
Peste-des-Petitis Ruminants (PPR)	At 3 months of age	Not required	Every 3 years
Enterotoxaemia (ET)	At 3–4 months of age	3–4 weeks after 1st Injection	Every 4–6 months interval
Foot & Mouth Disease (FMD)	At 3–4 months of age	3–4 weeks after 1st Injection	Every 6 months interval
Goat Pox (GP)	At 3–4 months of age	3–4 weeks after 1st Injection	Annual vaccination
Haemorrhagic Septicaemia (HS)	At 3–4 months of age	3–4 weeks after 1st Injection (2 doses at 1 month interval)	Every 6 months interval/annual vaccination
Blue Tongue	At 3–4 months of age	4 weeks after 1st Injection	Annual vaccination
Johne's Disease	1 month and above	4 weeks after 1st Injection	Annual vaccination

such cases. The details regarding deworming schedule of goats are given in Table 3.

Selection of healthy doe and buck for breeding

Before purchasing, udder of female should be properly inspected for presence of any kind of defects. Females should only be mated after they have reached 70% of their adult body weight. When does are bred too early, they produce more weaklings, which lead to a greater rate of kids loss. Both males and females should have an ideal body weight corresponding to their age and breed. Choosing males and females born as twins or triplets from a line of prolific parents leads to a significant improvement in the flock's kidding percentage.

Vaccination of goats

All the goats should be vaccinated against major diseases of kids i.e. Enterotoxaemia, Tetanus and Colibacillosis (Table 4). Enterotoxaemia tends to be more deadly in young kids, and often in those which are the heaviest or fastest gaining and it is caused by the bacteria *Clostridium perfringens* types C and D. Tetanus is a neurological disease caused by a toxin which is produced by the bacterium *Clostridium tetani*. Clostridial organism is very common in soil and in the manure of animals. Bacterial spores enter the

body through wounds caused by castration, ear tagging, disbudding, kidding etc, and symptoms occur 4–21 days later. Colibacillosis is one of the most common diseases of young kids with a high death rate. In neonatal coliform diarrhoea, enteropathogenic strains of *Escherichia coli* colonize the small intestine and produce an enterotoxin that causes diarrhoea.

Breeding females for enterotoxaemia and tetanus should be vaccinated 4–6 weeks before kidding. Pregnant goats for colibacillosis are vaccinated with two doses of vaccine subcutaneously 40–50 and 15–20 days before parturition against the natural form of enteric colibacillosis. By vaccinating does in late pregnancy, some immunity may be passed on to the kids through the colostrum.

Farm bio-security measures

Bio-security is a collection of procedures for reducing the spread of disease-causing organisms in animal populations, including their introduction, spread within the population and release. The most common entry routes for disease and pathogen transmission are disease infected or carrier animals, people working on farm or other visitors, vehicles, equipment and feed and water. Proper arrangements of bio-security can reduce levels of kid mortality by decreasing disease incidences.

Preventing the introduction and spread of diseases: Selection of purchased animals is done after knowing the health history of herd from which animals are purchased. Purchase of animals without knowing their vaccination history is discouraged. Also, all new arrivals are isolated/quarantined for at least 30 days. Quarantined animals must not share community pastures and hired buck from other farms for breeding. Movement control is practiced on farm by recording all visitors entry into the farm. Provision of footbath at the entry level of farm especially with potassium permanganate solution and lime can reduce entry of infections. Sanitation is attempted to prevent manure contamination of feed and equipments used orally. Usage of different equipments to feed and to clean pens or complete cleaning between use is encouraged. Feeding equipments and animal handling equipments should be routinely cleaned and disinfected, and animals must transported in clean vehicles.

Common management practices to control diseases in the farm

The given practices should be implemented to control the diseases in the goat farm.

- Avoiding over-crowding of animals in the shed
- Separating the sick animals from healthy flock
- Allowing suckling of kids only after washing of udder
- Keeping young stock separate from the adult goats and keeping the kids group-wise according to their age like 0–1 month, 1–2 month etc.
- Following proper quarantine measures for a period of 30 days while purchasing new animals
- Avoiding grazing early in the morning and during late evening
- Following rotational grazing of goat to control infection
- Disposing dead animals properly
- Following proper vaccination and deworming schedule.

SUMMARY

There are several reasons for

mortality of kids in the goat farm. Good management practices should be followed in order to reduce mortality of kids. The selection of doe at proper age and weight is required for birth of a healthy kid. Maintaining balanced nutrition of does throughout their pregnancy period ensures production of healthy and viable kids. Good sanitation and hygienic measures of

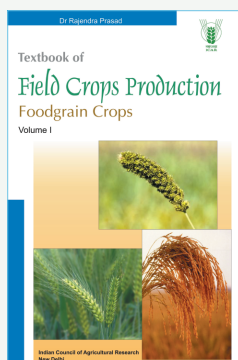
farm can reduce infection to the does and kids. Vaccinating the pregnant does against infectious diseases can help reduce kid mortality as immunity would pass through colostrum. Proper care immediately after birth and feeding of colostrum to kids are very important measures to reduce kid mortality. Deworming and vaccinating the kids and goats at right age can increase kids

survivability and farm profitability. Season-wise follow of scientific goat management strategies will reduce the mortality of kids in goats.

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Textbook of *Field Crops Production* – Foodgrain Crops

(Volume I)



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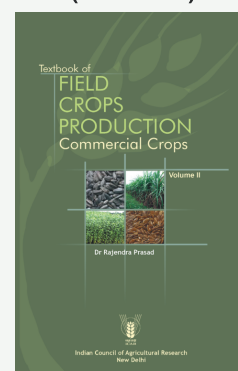
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