



Goat value chain development for empowering rural women in India

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ABSTRACT

Small land holdings, low agricultural productivity and lack of employment opportunities, have compelled over 25% of the rural population in India, to live in poverty and livestock is a major source of their livelihood. In rural India, 33.014 million households keep goats; 70% of the 135.17 million goats are maintained by the poor for milk, meat, manure and emergency cash reserve. However, they have not been able to realise the potential of goat husbandry due to lack of veterinary services, financial support and market linkage. The only existing scheme of the Government of India during the XI Five Year Plan (2007–12), spent only 10% of the budget, due to poor interaction with goat keepers. In the absence of good extension network, new technologies could not be transferred to farmers.

Key words: Black Bengal goats, Goat keepers' groups, Goat value chain, Rural women empowerment, Sirohi goats

To empower poor goat keepers, particularly women, BAIF in association with ILRI, implemented a goat value chain development project in backward villages of Jharkhand and Rajasthan states, wherein, women were mobilised and trained to form their groups to maintain elite bucks of local breeds and to share good management practices. Local youth, preferably women, were selected and trained as Field guides, to serve 4–5 groups each, by organizing health camps, vaccinating against locally prevalent diseases, deworming, castration, guiding on supplementary feeding, cultivation of fodder and marketing of goats. An innovative platform was facilitated for networking among various stakeholders such as goat keepers, veterinarians, Disease Investigation Laboratory, traders, meat shop owners, pharmacists, feed suppliers and financial institutions. Regular interaction enabled them to understand the expectations of others and to focus on improving the productivity and profitability. Goat keepers understood the market needs and untapped opportunities. Local youth initiated direct marketing by transporting goats to urban markets which fetched 25–30% higher price over the local market. Goat keeping families who adopted good husbandry practices, could earn 250–300% higher income, due to birth of healthy kids of elite breeds, low mortality, high growth rate, good health, early maturity, sale of animals on weight and as breeding stock. Field Guides ensured programme sustainability by providing services beyond the project.

India has been facing shortage of mutton and the annual

demand is likely to increase from 0.6 million tonnes in 2011 to 1.275 million tonnes in 2030, causing a shortfall of 0.25 million tonnes (FAO, 2012). Learning from this project, productivity of goats can be improved to meet the growing demand, if the Government can provide technical and policy support for genetic improvement, disease surveillance and control, feed management, marketing and empowerment of goat keepers and field guides.

Over 65% population in India is living in rural areas, mostly dependent on agriculture for their livelihood. However, about 10–12% of the rural families are landless and 80% of the land holders are marginal and small farmers, owning less than 2 ha land (Government of India 2013 b). As most of them are dependent on erratic rainfall for crop production under low input regime, crop yields have been low, pushing them towards poverty. Presently, over 25% of the rural population in the country is living in poverty and there are certain backward states in Central India where the population of rural poor ranges from 30 to 50%. In the absence of income from crop production, most of the small farmers maintain different species of livestock with goat being popular among the poorest.

Out of the 138.27 million Indian rural households, about 50% families maintain goats. Goat is known as 'cow of the poor', as those who cannot afford to keep cows and buffaloes for milk production, prefer to maintain goats. Goat is of economic importance to people living in arid, semiarid, hilly and remote tribal areas, because of its tolerance to harsh weather conditions, ability to feed on inferior quality crop residues, small body size, high rate of growth and short gestation period. Most of the poor, landless and particularly women maintain 3 to 5 goats and let them out for grazing. During dry months when fodder is not available on

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community pasture lands, goat keepers try to collect either grass from private lands or branches of roadside trees for supplementary feeding. Depending on the productivity of the does and domestic needs, the owners collect some milk for domestic consumption. They generally sell male kids after 5 to 6 months of weaning and retain the female kids as future breeding stock. Thus, goats provide some income without any investment. Very often, these goats serve as emergency cash reserves, to meet urgent needs such as medical treatment, education of children, procurement of agricultural inputs, etc. Thus, in spite of prejudice due to environmental issues and lack of support from the Government for development, goat population is growing at a faster rate compared to other livestock species.

Out of the world population of 1078.2 million goats in 2008, India accounted for 125.7 million goats and 14.6% of the world population, ranking second after China. The goat population in India has increased from 47.2 million in 1951 to 154 million in 2012 and over 70% are owned by landless and small farmers. During 2011–12, India produced 4.59 million tonnes of goat milk and 0.596 million tons of goat meat and ranked first in milk production and second in goat meat production, contributing to 29% and 12% of the world's milk and meat production respectively. The total value of the produce from goats in 2012–13, was ₹ 22.138 billion (USD 369 million), equivalent to 0.4% of the GDP of India. Out of this, 53.9% was contributed by meat, 24.9% by milk and 3.6% from skin. Goat is also an important and expensive source of meat in India and has good overseas demand, particularly in the Middle East, resulting in further price hike. In spite of shortage in the domestic market, India exported over 16000 tons of mutton worth ₹ 4250 million (USD 68.5 million) in 2012–13. The demand for mutton is steeply rising from the present level of 0.77 million tonnes to 1.025 million tonnes by 2030, creating a shortage of 0.25 million tonnes per annum (FAO 2012). Goat is also considered as a special animal used for religious sacrifice by two major communities namely Hindus and Muslims during certain annual festivals, which provides an opportunity for goat keepers to realise higher price. Goat milk is used for medicinal purposes and for production of superior quality cheese.

Status of goat husbandry

India has 23 recognised breeds of goats inhabiting different agro-climatic regions. They have evolved to suit the local climate and feeding conditions. Certain breeds such as Jamnapari, Beetal, Barbari, Osmanabadi, Surti, Zalawadi, Sirohi and Malbari are known for milk production, yielding 150 to 280 kg milk in a lactation of 100 to 250 days. Breeds such as Black Bengal, Ganjam and Kanniadu are known for producing superior quality meat. Changthangi and Chegu are the breeds of Himalayas maintained for fine fibre. Different breeds vary in their body weight, shape and texture of the skin (Deo and Hegde 2013). The body weight of male goats of different Indian breeds varied from 30 to 75 kg, with the exception of Black Bengal

breed, where the average weight of males was only 15 kg. However, the average carcass weight of Indian goats is only 10 kg, as compared to goats in China (13.7 kg) and Pakistan (17 kg). This is an indication of low productivity resulting from genetic erosion and poor growth.

Absence of a planned programme for breed conservation and genetic improvement has resulted in severe genetic erosion. Rajasthan state which is dominated by arid and semi-arid regions has the largest goat population in the country. The local goat keeping communities have a traditional system of keeping one superior quality buck in the village, as an offering to the village deity. This buck known as *Amariya* is let loose for grazing anywhere in the village and breeding. Although this is an excellent system for genetic improvement, there are several drawbacks such as inbreeding, spread of sexually transmitted diseases and non-availability of the buck on many occasions due to lack of control and ill-health. It is only in a few progressive areas that services of outstanding bucks are provided by experienced goat keepers on payment of service fees.

A majority of the goat keepers have been letting out animals for grazing on village common lands and community pastures, apart from feeding crop residues. However, during recent years, neglect of community land development has reduced the forage production significantly. The lands reserved for grazing have been reducing due to diversion for other purposes and encroachments. The availability of crop residues has also reduced significantly as many large farmers have shifted from traditional food crops to cash crops and high yielding varieties of food crops, which produce lower quantity of forage. This has been affecting the growth of goats. Most of the goat keepers do not consider supplementary feeding to be economical. In a study carried out on feeding of 3 month-old kids of Osmanabadi breed maintained on three systems of goat feeding such as fully grazing, semi-stall feeding and complete stall feeding, the economic return after 12 months of feeding was highest in the grazing group compared to semi-stall fed goats, while the goats maintained under stall feeding could not make break even (Korutkar 2001). This highlights the extent of unfair trading practices, which is making stall feeding unaffordable.

Poor health care has also been affecting the productivity to a great extent. The major causes of ill-health are infectious diseases such as Foot and Mouth Disease (FMD), Peste des Petits Ruminants (PPR), Hemorrhagic Septicemia (HS), Enterotoxaemia (ET), Goat Pox, Jhones' Disease, Tuberculosis, Anthrax, Brucellosis, Coccidiosis and different species of ento and endo parasites. Among them, PPR, ET and Goat Pox were more common. PPR has been the cause of high rate of mortality. Most of these diseases could be prevented through timely vaccination and good husbandry practices. However, in the absence of any vaccination programme undertaken by the State Animal Husbandry Department until severe disease outbreaks are reported, most of the goat keepers have been taking initiatives on their own. Although Brucellosis was widely

prevalent, most of the goat keepers were unaware of the problem. There was no programme for disease investigation and vaccination in spite of the vaccine being produced in India. Most of the goat keepers were also not aware of the danger of endo-parasites, except in peri-urban areas. The mortality of goats has been high up to 40 to 50% in the blocks infected by PPR and 15 to 20% in other blocks. About 75% farmers did not approach the veterinary services to treat their goats for any illness, as most of the goat keepers have been living in remote villages. Thus, the potential of the goat sector has not been optimally realised due to neglect of genetic improvement, lack of health care, shortage of feed and fodder, lack of financial support and low price realisation because of unfair trade practices. These goat keepers being uneducated and unorganised, were unable to raise their voices for help from the Government for goat development.

About 25 to 30% goat keepers sold their goats to local traders, who were middlemen, supplying goats to either local meat shop owners or sold in towns while the others sold their goats in local weekly markets. The goats purchased by middlemen travelled up to a few thousand kilometers to reach metropolitan city markets, particularly during festival seasons. Generally, sale transactions were based on physical observation and assessment of weight, by lifting the goat, holding at the pelvic region. This has been a process of bargaining based on false valuation, resulting in heavy exploitation of poor goat keepers. Very often, goat keepers sold their goats in a hurry to meet their emergency needs, where exploitation was high. Hence, most of these poor did not want to make additional investment on adoption of better management practices or inputs, which further contributed to poor management and low returns. As the return from goat husbandry reduced, the goat keepers were compelled to increase their herd size, which increased the pressure on community forests and pastures.

On-going goat development programmes

Goat population was closely linked with the ecosystem. In the regions where soil moisture availability was low either due to failure of rains or lack of irrigation, farmers shifted from agriculture to dairy husbandry. As the fodder and feed availability reduced due to low soil productivity, they shifted from large animals to small ruminants, particularly goats. Hence, in the 80's, several goat development schemes were launched by the Government to provide goats to small farmers. Each selected family received 5 to 20 female goats and 1 to 2 bucks under different schemes. Most of the projects brought goats from outside and distributed them, causing a sudden increase in the goat population in the project area. In the absence of support activities such as fodder development and feed management, there were several negative impacts, causing severe pressure on the ecosystem and biodiversity. This led foresters and environmentalists to conclude that goat development was detrimental to the environment. Since then, neither the international donor agencies nor the Indian

Government agencies have been promoting goat development. Subsequently, several studies were conducted by various organisations to assess the negative impact of goat on degradation of forests by various organisations which revealed that the allegations made on goats were baseless. Nevertheless, there was no support for goat development in the 90's.

The only goat development programme in India during the Eleventh Five Year plan (2007–2012) was the Integrated Development of Small Ruminants and Rabbits, to support establishment of 108 clusters of sheep and goats, with 100 units in each cluster (GOI 2013 a). Each unit comprised of 40 females and 2 males. The programme covering free training and orientation and 25 to 33% subsidy for establishment of individual units, was implemented through the National Bank for Agriculture and Rural Development (NABARD). This scheme naturally did not include the vulnerable target groups like small farmers and women. As this scheme did not have direct association with the Animal Husbandry Department, Marketing organisation or Processing agency, the response was poor and hence, out of the budget outlay of ₹ 1900 million (US\$ 1= ₹ 62), only 5.8% amount was spent. There were a few other schemes to develop the Pashmina industry by promoting the development of Pashmina goat breeds such as Changthangi and Chegu in the high altitude Himalayan regions.

Considering the importance of goats to support the rural economy, the Government of India has established an independent research organisation - Central Institute for Research on Goats, under the Indian Council for Agricultural Research (ICAR), in 1979. The mandate of the Institute is to undertake basic and applied research in all disciplines of goat production and product utilization and to transfer technologies for improving quantity and quality of meat, milk and fibre production from goat. ICAR is also supporting research on goat which is conducted by 14 research centres of various Agricultural / Animal Science Universities under a Coordinated Research Network across the country. Some of the significant contributions in Goat research were - molecular genetic structure and DNA sequencing of different goat breeds, identification of indicator traits for resistance to gastro-intestinal nematodes, skin colour as adaptation mechanism for climatic tolerance, use of fresh chilled and frozen semen for AI, use of IVF-ET techniques for genetic improvement, sonographic imaging technique for pregnancy diagnosis with 90% accuracy, development of anti-diarrheal and ectoparasitidal herbal medicines, ELISA kit for diagnosis of Brucellosis and JD, development of fodder blocks and complete feed blocks, economic milk replacers and pre-weaning feed for kids, etc. (CIRG 2013). However, in the absence of suitable infrastructure and skilled human resources, most of these technologies could not be transferred to needy farmers. Lack of efficient coordination between research institutions, development departments and extension network to reach the needy farmers, has also been another problem.

BAIF in goat development

BAIF Development Research Foundation is a Civil Society Organisation committed to promote sustainable livelihood for the rural poor in India. BAIF has been providing cattle and buffalo breeding services to poor farmers to upgrade their livestock to enhance milk production. Presently, BAIF is operating over 5000 livestock development centres, each centre managed by a trained paravet to provide breeding services to cattle and buffaloes in 8 to 10 villages benefitting over 2000 families. This programme of genetic improvement using semen of exotic dairy breeds, namely Holstein Friesian and Jersey to cross with nondescript Indian cows and to conserve native breeds, has been well accepted by farmers as well as policy makers in India. Under this programme, families maintaining three crossbred cows or buffaloes, could earn over ₹ 42,000 to ₹ 50,000 (USD 700 to 800) per year and enjoy sustainable livelihood. BAIF has also demonstrated the feasibility of increasing the milk production while reducing the herd size to reduce the ill-effects of global warming. BAIF has explored the scope for promoting the artificial insemination service using frozen semen as well, which could be provided by the paravets, who are engaged in providing breeding services to cattle and buffaloes. However operating an exclusive goat breeding programme is expensive due to thinly spread goat population.

The study

Realising the plight of poor goat keepers, about the non-availability of technical and financial support, leading to high mortality, low productivity and increase in herd size, a field research study was undertaken.

The objectives of the study were to document the goat management systems adopted by small goat keepers and observe the effect of various husbandry practices on the growth, productivity and profitability.

Study area: The study was undertaken in two states of India namely Rajasthan and Jharkhand. In Rajasthan, the project area included two backward village clusters in Sarda and Jhadol blocks of Udaipur district covering 11 large villages located in semi-arid region and receiving an average annual rainfall of 600 mm. The project covered 2685 families, of which 98% were poor and 94.4% belonged to Scheduled Tribes (most backward). The criteria for selection of these families were ownership of 2 to 5 female goats, belonging to Below Poverty Line (BPL) families, willingness to be a member of a goat keeper's group and accept the conditions set by the project. In Jharkhand, the project area was located in forest and hilly terrains of Jama block of Dumka district, covering 2000 families in 59 hamlets of 9 villages. With an average annual rainfall of 1200 mm, there was no shortage of forage. Over 98% participant families were tribals and 45% were illiterate. Only those families who had small number of goats were included in the study.

Baseline study: The baseline survey highlighted the following major problems:

1. The goat keepers maintained 4 to 6 non-descript goats, and sold them for Rs. 1250 to 1800 (USD 20 to 30), almost half the price prevailing in nearby towns;
2. In the absence of planned breeding using elite bucks, there had been continuous genetic erosion. High rate of mortality ranged from 25%, up to 55%. In certain regions which were infected with PPR, the mortality was higher. There were different diseases prevailing in different regions but vaccinations were not carried out well on time. Only 17% goat keepers had vaccinated their goats;
3. As the goat keepers were unaware of the hazards of ecto and endo parasites, most of their goats suffered from poor weight gain;
4. Goat keepers were heavily dependent on community pastures and village common lands for feeding their goats. The fodder production reduced significantly during recent years due to heavy encroachments and erosion of community pasture lands, causing feed scarcity;
5. About 15 to 20% goat keepers sold their goats to local middlemen, while the rest were sold in the local weekly market, on the basis of physical observation without realising the market value;
6. Although, goat keepers considered goat as cash reserve, they often had to sell their breeding stock or young kids at substantially lower price to meet various emergencies;
7. Most of the goat keepers were illiterate women, who were neglected and excluded from the mainstream development programme. Generating awareness, motivating and mentoring were most essential for ensuring their participation in the development programme.

Interventions tested: Based on the outcome of the baseline study, the following interventions were tested, involving State Animal Husbandry Departments (AHDs) particularly for providing veterinary support services to participant families:

Formation of women goat keepers' groups: Groups of 8 to 10 women belonging to homogeneous socio-economic status, living in the same hamlet, were formed, to bring 40 to 50 does under each group. The group members were oriented on the functioning of the group which included maintaining an elite buck provided by the project for availing breeding services, castrating inferior quality males at a young age, adopting good husbandry practices and meeting regularly to share their problems and experiences with other members of the group. They were also encouraged to organise savings and micro-credit for the members as and when required.

Selection of superior bucks: Superior quality bucks of local breeds, Sirohi in Rajasthan and Black Bengal in Jharkhand, were purchased for distribution among goat keepers' groups. While selecting the bucks, the parameters under consideration were, born as a twin or a triplet, good body weight at birth at various stages of growth, good body

shape, phenotypic breed characters and free from diseases. One member from each group was identified by the group to maintain the buck and collect a nominal service fee to meet the cost of maintenance. These bucks were exchanged between different groups after two years, to avoid inbreeding.

Mentoring through field guides: Local unemployed youth who had completed their school education, preferably women having experience in goat husbandry, were selected and trained for 15 days in basic goat husbandry as well as for carrying out various services such as vaccination, deworming, castration, fodder production, supplementary feeding, treatment of external wounds, organising village level meetings and regular meetings of the groups. Each field guide was assigned 4 to 5 groups of women goat keepers to supervise and mentor them regularly. They were given a small honorarium and allowed to collect fixed service charges from goat keepers for various services provided to them. This enabled the field guides to gain confidence and operate the programme beyond the project.

Veterinary services: Regular health camps were organised with the help of Animal Husbandry Department (AHD). Castration of the male kids which were not to be groomed for breeding, were carried out at the age of 1 to 2 months. Fecal samples were analysed at the Disease Investigation Laboratory of AHD, before prescribing specific dewormer for control of endo-parasites.

Supplementary feeding: Various treatments were introduced for improving the nutritive value of crop residues. Cultivation of azolla and fodder trees on field bunds was introduced for fodder for goats. Mineral blocks were developed and supplied to goat keepers for nutritional supplementation.

Development of value chain: Lack of coordination among various stakeholders was the constraint for fetching fair value for goats. Hence, all the stakeholders particularly representatives of goat keepers, local veterinary doctors of the Disease Investigation Laboratories, State Animal Husbandry Department, traders, meat shop owners, pharmacists, fodder and feed suppliers and financial institutions were invited on a common platform for networking among themselves. Regular interactions enabled them to understand the expectations of others and to improve the productivity and profitability.

Introduction of various husbandry practices resulted in a very significant improvement in the growth and production of goats owned by the participant families, compared to non-participant families. As a part of the goat value chain, they were able to explore various opportunities to improve the productivity and higher price realisation.

Improvement in growth

Goat keepers understood the market needs and opportunities to avail various services at competitive rates. With the use of elite bucks of recognised breeds, there was significant improvement in the quality of new born progeny with respect to breed characters, birth of twins, body weight,

body shape and health conditions. They reached maturity at an early age with higher body weight and high rate of kidding. Some of the new progenies were sold as breeding stock fetching very high premium.

Regular vaccination, deworming and feeding resulted in low mortality and higher body weight gain. Monitoring of body weight not only motivated the owners to feed their animals well but also to calculate the cost benefit analysis of feed supplementation. Improved health status and higher weight gain reduced the age at puberty and maturity. Reduction in mortality from 35% to less than 5%, resulted in increase in the average herd size of the families. Regular mentoring by field guides to cull weak animals to restrict the herd size, helped to control the growth of goat population. At the end of two years of the study, most of the non-descript unhealthy goats were replaced by goats of other breeds. Singh *et al.* (2014) have also reported similar results, in a goat husbandry improvement study undertaken in Bundelkhand region where the goat keepers were provided with elite bucks of Bundelkhandi breed, followed by introduction of vaccination, deworming and nutritional supplementation. This enabled the goat keepers to produce healthy goats and fetch 30 - 50% higher price.

Marketing

Interaction with goat traders at the meetings of the innovation platforms enabled goat keepers to understand market expectations. Selling of goats based on the body weight empowered the women goat keepers to bargain better and fetch 200% to 300% higher price, even in local market. Local youth who volunteered to collect saleable goat from the village and transported to sell in nearby towns could earn 20 to 30% more over the local market. Characters of recognised breeds, good body shape and higher weight gains influenced the buyers to pay premium price over other goats. Such higher price realization was also due to greater awareness among illiterate and semi-literate goat keepers who were neither aware of price for goat meat nor weight of their animals, which enabled the middlemen to exploit heavily, particularly in remote villages. Mohan *et al.* (2014) also reported that with good extension programme, goat keepers took better care of their animals to improve the body weight and physical appearance, while empowering themselves to bargain better, to enhance their income significantly.

DISCUSSION

The study demonstrated the potentials of transforming goat husbandry as a sustainable livelihood programme for small farmers in remote rural areas. It also evolved an innovative approach for genetic conservation involving local communities, which has scope for wider replication across the country. Field guides gained confidence to provide critical services while earning substantial income beyond the project and to host the network of stakeholders. The members of the Goat Keepers' Groups could serve as field demonstration units for other farmers.

For wider replication of such a goat development programme, the following policy and financial support will be required:

- Empowerment of Field Guides: Training, Supply of first aid kits, Access to D I lab, Monitoring and guidance from the AHD;
- Genetic Improvement: Incentives for Breed conservation, Selection of elite germplasm and performance recording, AI with frozen semen, Annual goat shows;
- Disease Surveillance: Disease mapping, Diagnostic services, Public awareness, Cold chains for vaccinations;
- Feed Management: Community pasture development, Forage production on wastelands;
- Marketing: Establishment of block level market yards, Aggregation and direct marketing by goat keepers, Promotion of milk and meat processing facilities;
- Empowerment of Goat Keepers: Training, Demonstrations, Support for Farmers' groups, Credit facilities, Insurance, facilitation of stakeholders' meetings.

Goat development has excellent potential for providing sustainable livelihood to small farmers in India. However, there is a need for making a coordinated effort to introduce various technologies leading to good husbandry practices and development of suitable forward and backward linkages to form an efficient value chain. This along with mentoring

of small farmers is most critical for the success of inclusive development which can be managed by village level para-professionals or field guides.

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