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The Importance of Goats in the World

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THE IMPORTANCE OF GOATS IN THE WORLD

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Abstract

It is a challenge to transform the mindset of subsistence farmers to consider goats as a productive asset. Goat health, breeding, housing and nutrition are the main challenges in a smallholder production system. The development of the goat market sector is informal and underdeveloped. As a result, goats have not been identified as a significant contributor to the national gross domestic product. Many development organizations consider goats a preferred livestock commodity for poverty alleviation. Therefore, it is desirable to have a systematic approach to optimize goat production for smallholders. A smallholder goat value chain works well with a focus on improved goat production, increasing business and entrepreneur skills and organizing communities for strong social capital. Heifer International has large-scale goat value chain programs for smallholders in many countries. Partnership and collaborative efforts among academic/scientific, public/private sectors, producers and civil societies are critical for sustainable smallholder goat development.

Keywords: Goats, Smallholder Farmers, Value Chain, Poverty Alleviation, Partnership

Introduction

Goats are among the earliest domesticated animals and have been associated with humans for at least 10,000 years (Monteiro et al., 2018). Due to their adaptability to different environmental and climatic conditions, they are dispersed all over the world (Mahmoud, 2010). Goats are the most beneficial animals in the world, providing meat, milk, fiber, fertilizer, and draft power (Sinn and Rudenberg, 2008). Over 1,153 breeds of goats (FAO, 2007) exist on our planet, living on every continent except Antarctica and in a quite astonishing range of environments, from humid tropical rain forests to dry hot desert regions and cold, hypoxic high-altitude regions (Hirst, 2017). They are different from one another by their size, shape and production types.

Goats survive and reproduce under a variety of extreme conditions, making them an ideal species for resource-poor farmers, often tagged as "bank on the hoof" and "walking refrigerators." Unfortunately, it continues to be a challenge to transform the mindset of subsistence farmers to consider goats as a "productive asset" rather than a "saving asset."

Traditionally raised for milk and meat, goats are one of the most commonly consumed meats in the world as they are an excellent source of protein. Goat meat and milk pose very few religious taboos among the diverse human population. It is low in fat and cholesterol and high in vitamins and minerals. Similarly, goat milk is widely consumed worldwide and, for many, is easier to digest. Its rich, complex flavor and nutritional qualities have helped the goat cheese industry become a major niche market in Europe and the United States. Goat products have become sought-after commodities in developed countries (Sinn and Rudenberg, 2008).

In rural areas of developing countries, the contribution of goats is highly significant and has an important role in feeding resource-poor populations. When smallholder farmers cannot raise cattle

and other large animals, goats become the preferred choice. They are ideal for household milk and meat production and can be easily sold for immediate income. The milk and meat produced by one goat is the perfect balance: it is often sufficient to meet children's nutritional requirements, without the storage problems associated with the larger volume produced by large animals. Goats are readily adaptable and thrive in all types of climatic conditions (tropical, cold, dry or humid climates). Due to the size of goats as compared to other species, they can be raised in very small landholdings of resource-poor smallholder farmers.

Goat Population in the World

The current global goat population according to the Food and Agriculture Organization (FAO) is 1.002 billion (FAOSTAT, 2018), which has doubled in the last thirty years. Figure 1 shows the trend of the goat population, which was below 400 million during the early 1960s when FAO started collecting data and has increased to over 1 billion in 2018. The goat population has increased with the increase in the human population, probably due to resource-small smallholder farmers finding it suitable for diversifying sources of their income and nutrition. Goats are one of the best livestock available resources to meet that need.

Figure 2 suggests that goats are mainly concentrated in Asia (57.7%) and Africa (35.7%), making up 93.4% of the total number in the world (FAOSTAT, 2018). This is due to the importance of goats to the high number of poor and smallholder farmers in Asia and Africa. The production of small ruminants, especially sheep and goats, is largely rooted in specific regions, for both historical and religious reasons. This is the case in Muslim countries where pork is not a food option, and in India where beef is not eaten, in both cases due to religion.

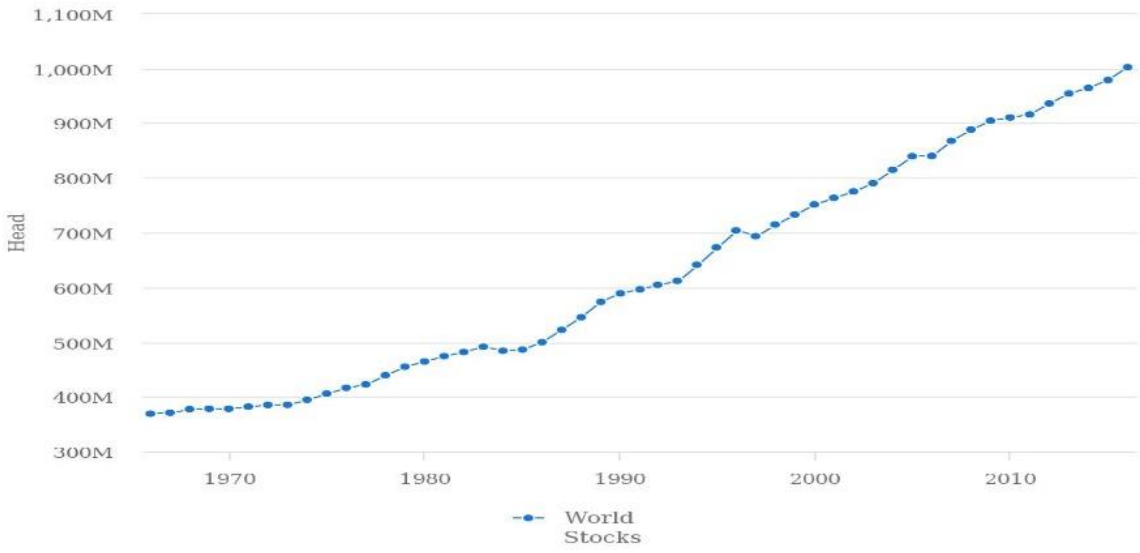

Figure 1. World Goat Population Growth Trend between 1970 and 2018

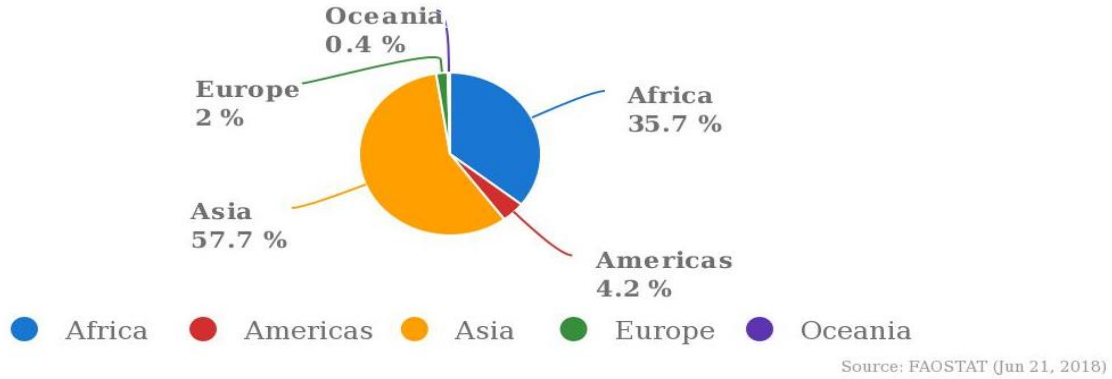

Figure 2. Production Share of Goats by Region, Average between 2000 and 2016

Figure 3 shows the leading countries in goat production in five Asian countries (China, India, Pakistan, Bangladesh and Iran) and five African countries (Nigeria, Sudan-former, Sudan, Kenya and Ethiopia) (FAOSTAT, 2018). These goats are mainly raised for meat and milk, and to some extent for fiber.

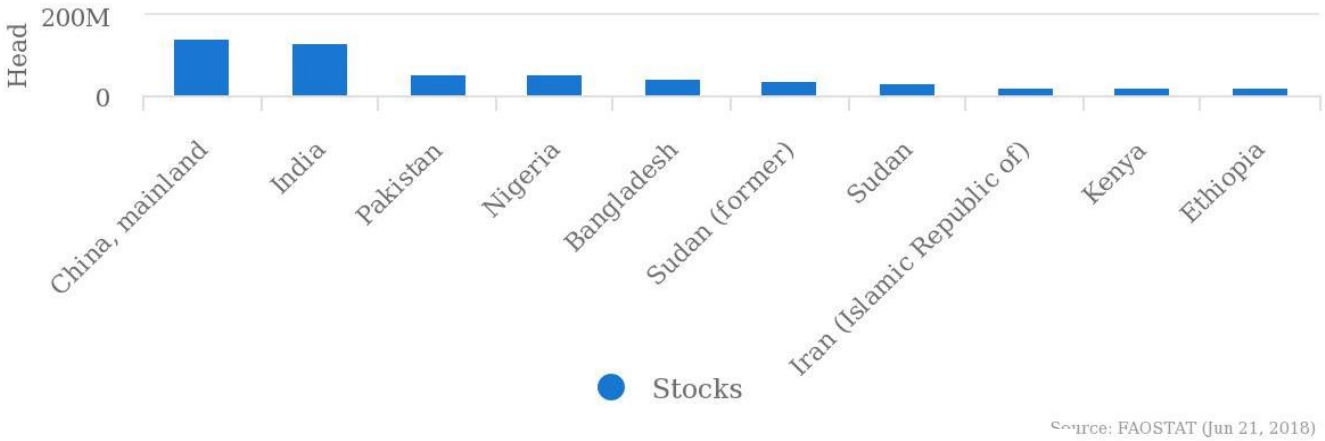

Figure 3. Top Ten Goat Producing Countries of the World between 2000 and 2016

Goats and Smallholder Farmers

Goat farming is an integral component of smallholder farms in Asia and sub-Saharan Africa. Goat meat and milk are produced and consumed locally among the poor in developing countries. Goats are also a source of immediate income in case of emergency and the reason why they are considered a "bank on the hoof." In terms of goat milk and meat production, developing countries are in the lead, reflecting the importance of these commodities to feed millions of smallholder farm families in these countries. Goats require less feed to raise because they are smaller, and they prefer brush and browse. These are some of the reasons why goats are a preferred species among smallholder farmers around the world.

Goats provide multiple benefits to farmers in developing countries. In a small-scale approach, the type of enterprise combination, ecosystem and production system must all be considered. Goats exhibit a very high productivity potential that, if well promoted, can easily help to improve the rural economy within a very short time.

Goats for Community Development

Small livestock, especially goats, is vital for the livelihood of many rural resource-poor smallholder farmers and is often the only asset they possess. Goats significantly contribute to improving nutrition, providing food with high-quality nutrients and micronutrients. Goats generate income and savings, especially for women, enhancing their capacity to cope with economic emergencies and reducing debt. During times of crisis, goats play an important role as 'mobile' food assets (International Goat Association, 2014). Goats are often the "sacrificial" animal during religious festivals and social ceremonies. Goat keeping has proved to be instrumental in achieving the Sustainable Development Goals.

The goat sector has not followed the same path of development and intensification as other livestock production sectors such as cattle, poultry, pigs, etc. It continues to be a challenge to transform the mindset of subsistence farmers to manage goats as a "productive asset" rather than continuing the traditional practice of using it as a "savings asset." Goat marketing activities have been largely excluded from organized markets. It is important to recognize the opportunity that goat farming offers to nutrition and economic development. Goat production systems are multi-purpose systems oriented towards the production of milk, meat, manure, fiber and skin. Goat development projects generally consider these multifunctional characteristics.

International development agencies have varied practices of supporting smallholder farmers through goats. Providing goats to smallholder farmers along with technical trainings for increasing the capacity to raise goats and to increase income is one of the preferred methods development agencies employ. The provision of microcredit has also helped poor smallholder farmers to buy and raise goats. Support for improved production and health, product development (processing and marketing) and institutional development (farmer capacity, organization, market development, and smallholder farmer-friendly policies) are keys to the success of goat production at scale.

The critical first step for smallholders to earn a *living income* through goat raising is to build their capacity in production and marketing. Smallholder engagement is essential for addressing the goat production and marketing gap and it also ensures that smallholder farmers are motivated for change.

Heifer International's Experience in Goat Production

Heifer International believes that the collective power of economic development, food security and nutrition, and environmental sustainability can empower small-scale farmers on the path to *living incomes*. When those components are multiplied by the positive impacts of women empowerment and social capital, communities achieve greater resilience and a sustainable reduction in hunger and poverty. *A living income* is all the income of a household earned/generated or transferred whether cash or in-kind, sufficient to enable all members of the household to afford a decent standard of living (Heifer International, 2017). This includes nutritious food, safe housing, education, clothing, health care, transportation, communication, culture and entertainment, and provision for external support and unexpected events.

Heifer International has learned that the most reliable, sustainable way to end hunger and poverty where it works is to develop and strengthen inclusive local economies. Heifer does this by helping people start or expand farmer-owned agri-businesses, cooperatives and social enterprises so they can profitably participate in pro-poor wealth creating value chains.

Smallholder farm entrepreneurs in Nepal, India, Bangladesh, China, Zimbabwe, Senegal and Haiti (to name a few) are playing a key role in rural economic development via large-scale goat value chain projects. These smallholders design and commercialize products and services, create jobs and generate new waves of economic development in their communities. Heifer equips socially-minded entrepreneurs, especially women and youth, with the skills and resources they need to earn living incomes. Heifer's large-scale goat value chain program in Nepal includes more than 200,000 households and more than 70,000 households in India.

Heifer International Theory of Change

Heifer's work focuses on improvements in the five domains below, which work together to move smallholder farmers from vulnerable to sustainable. Physical aspects (red blocks) combined with social aspects (orange blocks) form a multiplier effect that accelerates processes and expands impacts as shown in Figure 4. Goats are serving as an entry point of these Heifer programs. The large-scale goat programs have helped smallholder farmers to move out of poverty through combined efforts to address increasing animal production and productivity, building social capital and collective businesses.

Fig 4. Heifer International Goal and Theory of Change

Improved Goat Production

Heifer works with smallholder farmers to increase goat productivity by focusing on all aspects of animal well-being. Strategically selected community members are trained in primary animal health care and business skills. The graduated technicians are called Community Agro-Vet Entrepreneurs (CAVEs). CAVEs are mobilized to increase farmers' access to veterinary services and inputs for their goats. CAVEs earn their living income by selling technical services and animal production/health inputs to farmers for improved goat production and management. Nutritious fodder and forage for goats are extensively promoted along with mineral blocks and supplement feed made from locally available ingredients. Selection breeding, strategic placement of genetically superior quality bucks and prevention of inbreeding are practices that are consistently applied to improve the genetic potential of goats. Smallholder farmers are also trained in maintaining health and production records. As a result, there has been a significant increase in goat production and productivity. The average goat productivity has increased by 42% in Heifer project areas in Nepal in four years (Heifer International Nepal, 2016) and average kid production per doe per year has increased from 1.54 to 2.4 at the end of five years project period as shown in Figure 5 (Heifer International Nepal, 2017).

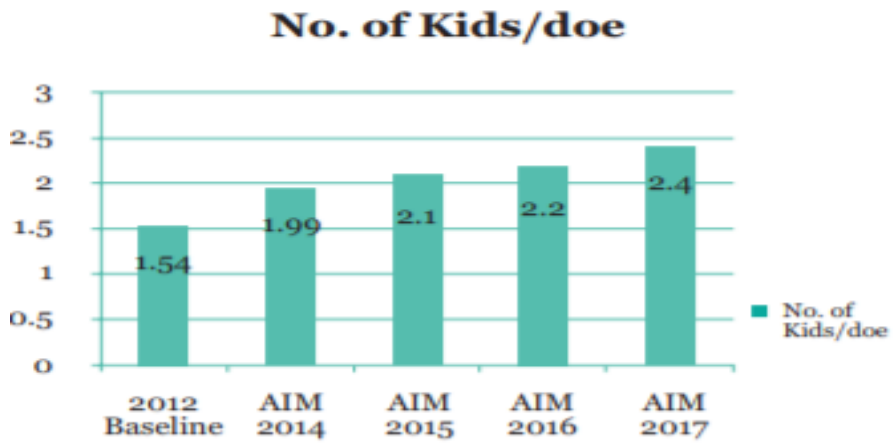

Figure 5. Increase in Goat Productivity (kids/doe/year) in Nepal
AIM: Annual Impact Monitoring

Goat Breeding

Technical interventions by most development organizations often lack focus on breed improvement of goats. Due to a lack of continuous, structural and established genetic improvement programs, and the indiscriminate breeding practices by smallholder farmers often yield negative genetic impact. The result is decreased genetic merit of goats leading to a decline in productivity. This results in inadequate availability of improved breeds for multiplication. Therefore, a systematic scientific approach for breed improvement aiming at the production of seed animals of generic merit is indispensable for increasing the impact.

Selection breeding practices within the breed can be adopted through the participation of community members to produce seed goats and to improve the genetic performances of the goat flocks. This is only possible through the introduction of performance recording (Solomon et al., 2014) and selection as a tool of technical intervention for the improvement of breeds of native goats so that gradual permanent genetic gain could be achieved over years. Heifer has successfully carried out a "community initiated genetic improvement in goats (CIGIG)" program. The analysis of this project clearly indicated that goat breed improvement through selection could be done with the participation of community smallholder farmers. Breed improvement analysis in this research was done by comparing the change in the value of the parameters of the average daily weight gain, average five months' live weight gain and three months' litter weight per doe at one-year intervals (Table 1).

Goat Health

At the smallholder farmer level, management of goat health is a critical aspect of improving goat production. Periodic vaccination and deworming of goats can reduce disease incidences. Reducing kid mortalities with better management practices is also very important for smallholders. Heifer facilitates the improvement of goat health through a community-based approach utilizing locally trained community members called community Agro-Vet Entrepreneurs (CAVEs). These CAVEs also support smallholder farmers in improving their animal management skills (not only limited to goats) and use their own farm as a demonstration

Table 1. Analysis of Goat Breed Improvement (Jamnapari X Khari cross) in CIGIG, 2014

Parameters	1st year	2nd year	3rd year
1. Average daily weight gain till five months (g)			
Male kids	81.90 ± 22.38	88.67 ± 21.93	95.23 ± 18.79
Female kids	72.14 ± 13.80	81.21 ± 18.02	84.08 ± 17.01
2. Average weight at five months (kg)			
Male kids	14.12 ± 3.39	15.46 ± 3.52	16.36 ± 3.43
Female kids	12.53 ± 2.06	14.14 ± 2.68	14.92 ± 2.59
3. Average three months litter weight (kg)			
First kidding	10.93 ± 4.14	12.13 ± 4.38	13.00 ± 4.35
Beyond first kidding	13.43 ± 5.42	14.70 ± 6.10	16.11 ± 5.12

Source: Heifer International Nepal, CIGIG research report-unpublished, 2014

site. Through these relationships, CAVEs build steady client bases for their services and products. This opportunity is attracting youth to agribusiness, reducing their migration to cities in many Heifer-supported communities around the world. The selected CAVEs go through a series of trainings including but not limited to animal health and husbandry, agribusiness and enterprise development, and facilitation and communication skills coupled with Heifer's social capital training. Due to enhanced animal health services provided by CAVEs, goat mortality has reduced significantly. Heifer India reported overall goat mortality below 2% in fiscal year 2016 (Heifer International India, 2016). CAVEs are instrumental in providing preventive services like periodic vaccinations and deworming, treatment and first aid services, input supply to smallholder farmers. CAVEs also provide training to farmers on new advances in animal production and health technology as part of the embedded service of their business. Heifer's current data shows that more than 2,400 active CAVEs, community animal health workers (CAHWs) and animal health promoters are serving smallholder farmers in Heifer communities (Figure 6)

Figure 6: Number of active CAVEs, CAHWs and animal health promoters in Heifer country programs. Highlighted are the countries where Heifer is currently working (as of May 2018)

Goat Feeding and Nutrition

Most of the goats kept by smallholder farmers in developing countries are seldom fed with concentrate feed, cereal grain or good fodder, resulting in lower production and performance. Goats can damage fragile environments if not properly managed. When goats are properly managed, they can serve as highly effective tools for improving the environment.

Heifer works with smallholder farmers who possess small plots of land. Heifer promotes zero-grazing practice in its projects. Heifer promotes improved fodder and forage production as a movement and facilitates cut and carry method for goat feeding. Smallholder farmers are utilizing unproductive and unused lands, public lands through leases, borders of irrigation canals, on two sides of roads and trails, terraces and bunds of the farmlands for fodder and forage production. Community nurseries managed by smallholder farmers are the main source of seedlings and saplings, in addition to leveraging similar resources from local government agriculture and forestry

departments. Smallholder goat farmers in Nepal have planted more than 8,000 hectares of land (Figure 7) in the last four years (Heifer International Nepal, 2016). Likewise, Heifer International India has planted more than 500,000 fodder/forage plants in fiscal year 2016 alone (Heifer International India, 2016). This trend is increasing in all countries where Heifer has a footprint. Altogether, more than 1.4 million different species of fodder and forage were planted, and more than 3,400 hectares of land was utilized for forage and pasture management in fiscal year 2017 (Heifer International, 2018).

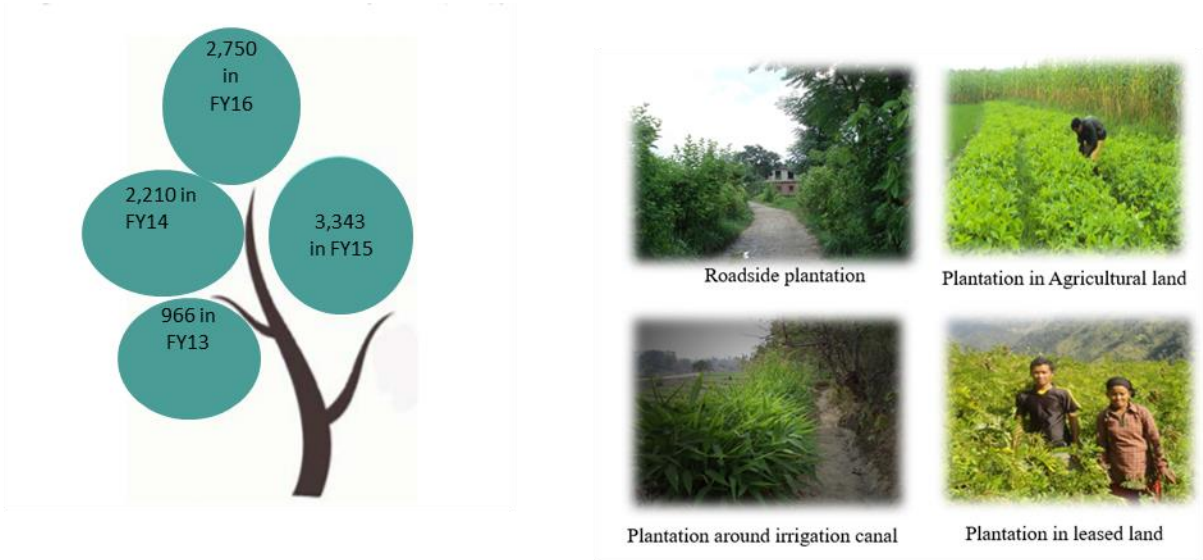

Figure 7: Fodder and forage plantation in Nepal in hectares

Heifer has also introduced the concept of feeding home-mixed concentrate feed and mineral block to improve goat productivity. To minimize feed wastage, improved and sperate feeding trough and waterer for the goats have been introduced. The concept of community fodder banks to address the challenge of feed shortage in the dry season has also been working effectively (Heifer International India, 2016).

Risk Management in Goats

Goat insurance is one risk management option available to smallholder farmers. But it is not widely practiced due to one or more reasons such as limited access to insurance centers, remoteness of communities, hurdles in verifying claims and complicated reimbursement processes. Within these realities, Heifer has been practicing community-managed insurance programs for goats and other livestock species, in addition to formal insurance if and where available. In community-managed insurance programs, the community members themselves develop guidelines, processes and templates for insuring their livestock, as well as setting premiums and developing mechanisms for verification and payment in case of goat death.

Farmer Field Schools for Goats

Farmer Field School (FFS) is a widely used extension approach in the field of agriculture. Farmers participate in FFS to learn the new technology by testing it in their own context and/or in a stage of the production cycle. It gives farmers an opportunity to compare existing management practices with new improved practices in order to make decisions over the whole production process. Farmers design their study, conduct experiments, make observations and draw conclusions to put into practice.

Heifer has a long history of finding innovative ways to increase goat productivity. Heifer country programs are innovatively adapting FFS in their goat projects. Using the improved practice, the average growth rate of goats was almost doubled as compared to traditional practices by smallholder farmers in Nepal, and the average time from birth to mating was reduced by more than 100 days. This means more and larger goats in less time, which translates to higher profits for the farmers. Figure 8 shows how the improved practices through FFS have increased the bodyweight of goats in six months (Heifer International, 2012). Improved practices in this case study include improvements in goat sheds with proper ventilation and manure management; improvements in feeding with supplemental locally-made concentrate feed, provision of water and mineral blocks; periodic vaccination against *peste des petitis ruminats* (PPR) and deworming. Traditional practices do not include any additional interventions.

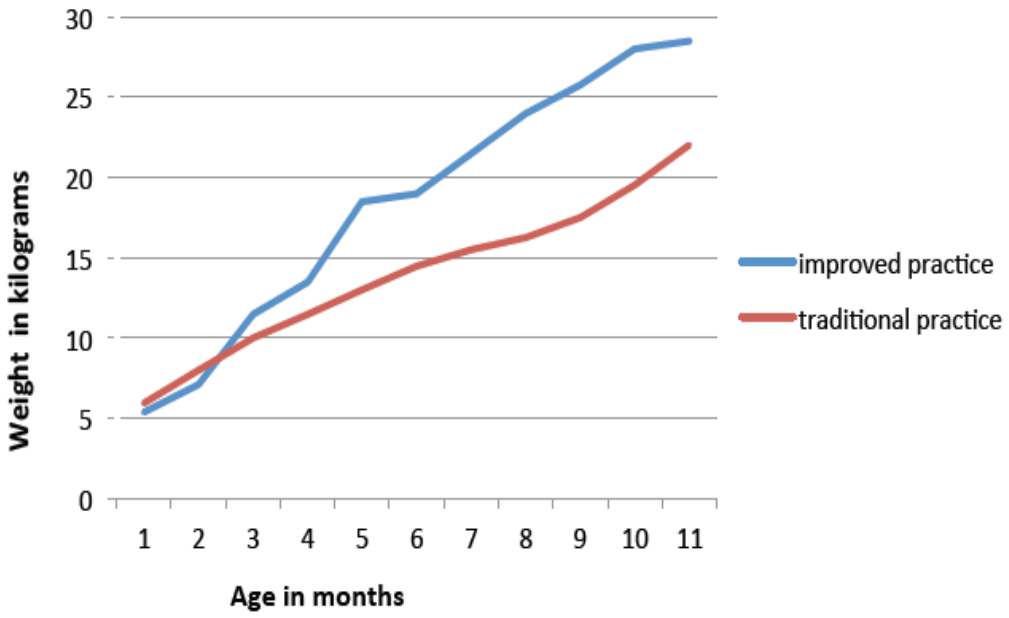

Figure 8. Growth Trend of Goats under Improved vs. Traditional System

Strengthening Social Capital and Market for Goats

Heifer's Values-Based Holistic Community Development model is a package of practices that creates social capital and builds an enabling environment for sustainable development work. Major components include a strong community structure to pool resources, discuss, identify and prioritize needs, plan and execute activities to empower groups such as cooperatives and producer associations; positive changes at a cognitive level, including strong social capital and positive attitudes among community members. Values-Based Holistic Community Development gives marginalized groups the capacity and drive to initiate enterprise activities and integrate into the market economy. The organized smallholder farmers in self-help groups (SHGs) and cooperatives are getting greater benefits along the goat value chains and have increased income through working as additional market actors in addition to their role as goat producers. The smallholder farmers who are part of large-scale goat value chain programs have started developing production strategies according to consumers' interests and demands rather than what they can produce. Heifer has observed a paradigm shift among smallholder goat farmers from production-driven to market-driven goat value chains.

Pro-poor wealth creating value chains (Figure 9) integrate poor and vulnerable groups into market activities in an equitable and fair manner. These value chains create lasting wealth that is rooted and stays in communities through local ownership, mutually beneficial linkages and inclusive business relationships. Heifer International works with farmers and communities to:

- Determine the best value chain opportunities
- Identify, support and strengthen agri-enterprises
- Deploy capital and technology
- Mobilize values-based private sector partnerships

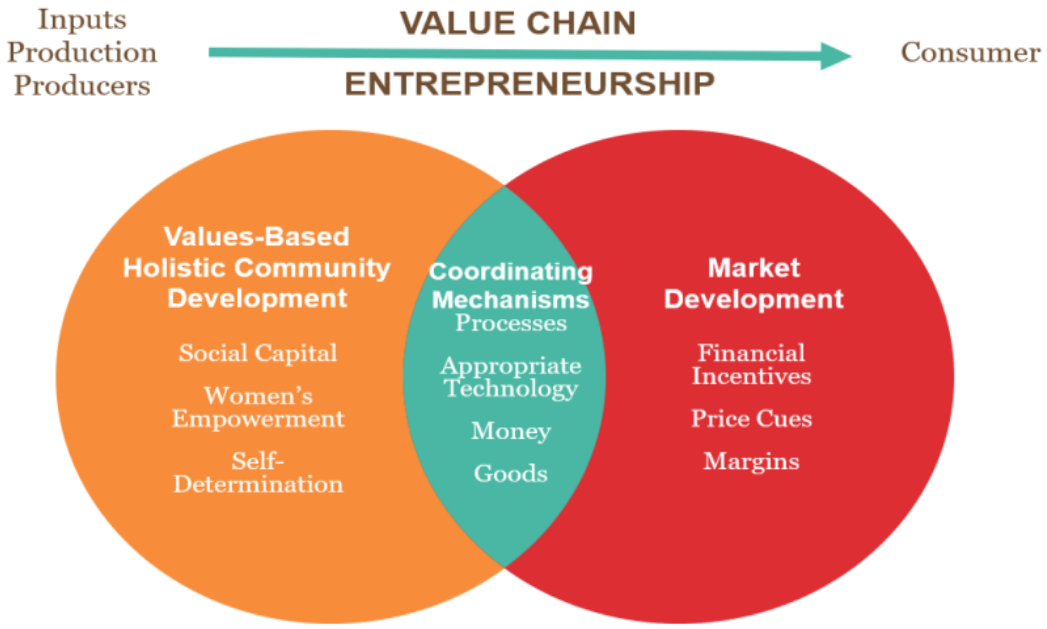

Figure 9. Heifer International's Pro-Poor Wealth Creating Value Chain Approach

Partnership and Collaboration

There are many challenges facing the smallholder goat industry, including low productivity, high mortality and frequent disease outbreaks, insufficient and inappropriate feeding practices and inferior breed quality including inbreeding. Most research organizations and universities engaged in the genetic improvement of goats are in developed countries. Research and development investment to improve low levels of goat productivity, especially in developing countries and breeds of goats available there, have not been exploited fully. Goats will be an important source of livelihood for smallholder farmers in the coming years (Mahmoud, 2010) and deserve more attention at the household level as well as at the country level. Raising awareness of decision-makers in national governments and development agencies about pro-poor goat development for poverty reduction is a key strategy to be considered. Funding adaptive and participatory research engaging smallholder goat farmers (who bring problems based on their current goat production practices) to identify appropriate and sustainable, economically viable and environmentally friendly goat production can be done through partnerships and collaborations with research institutions and universities (that bring solutions to the problems faced by smallholder goat farmers). With this approach, the problems faced by smallholder goat farmers can be addressed using science and technology. The dissemination of field-tested and proven successful goat production technologies through various platforms is equally as important as the adoption of market-led approaches supported by effective and qualitative services and market infrastructure.

Conclusion

Goats are the preferred livestock of smallholder farmers around the world as they are excellent converters of fodder/forage not preferred by other livestock species into very valuable sources of human nutrition and income. Asia and sub-Saharan Africa, where the goat population is concentrated, require more attention to improve goat production and productivity. These regions also house the highest human population living below the poverty line. There is a strong need for collaboration between research institutes and universities, and smallholder farmers for increasing goat production and productivity. Best practices and innovations around improved goat production are limited to specific geographical locations. Market development in goats is still in its infancy as compared to other livestock species. All the stakeholders of goat development (national and international development organizations, research institutes and universities, private sector players, government agencies and smallholder farmers) should work together in a public-private-producer-partnership (PPPP) model to enable higher production, for creating sustainable goat markets and for meeting the nutritional and income needs of resource-poor smallholder farmers.

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