

# Executive Summary

April 2018



## Gambia Goat Dairy – A Model System for Livestock Development in West Africa

*Fighting malnutrition with The Gambia's first commercial-scale goat dairy, creating an extension service, and establishing a national dairy industry*

### Objectives

- To create a commercially viable goat dairy farm in The Gambia. In 5 years, the farm will become a sustainable, replicable financial entity that achieves proof of concept by maximizing livestock productivity.
- To significantly improve maternal and child nutrition. Highly productive livestock create a stable, domestic source of accessible animal-based protein. This can measurably reduce the prevalence of population-wide protein and micronutrient deficiencies, low birthweight infants, and childhood stunting and wasting.
- To establish a robust Gambian dairy sector. An agricultural extension service led by Gambian veterinary paraprofessionals will introduce and prescribe modern agricultural techniques to smallholder farmers to increase yield and decrease environmental impact. The project will subsequently focus on dairy processing and distribution as a means of creating wealth for Gambian communities and bolstering the nation's economic independence.

### Overview

By the year 2050, there will be 9.7 billion people on planet earth. Currently, we're failing to feed just over 7 billion. Poor nutrition causes 45% of global childhood deaths under the age of 5 and perpetuates the cycle of poverty by undermining societies' productivity. Food insecurity is an enormous barrier to economic growth and development, as malnutrition can cost nations as much as 16% of their annual gross domestic product. Investing in effective nutrition interventions therefore stimulates economies, while investments in other areas of need do not proportionately benefit the nutritional status of a population.

Chronic protein and nutrient deficiencies often manifest as disease processes such as stunting, wasting, and low infant birthweights rather than overt starvation. A dietary increase in animal sourced foods provides much-needed protein as well as micronutrients such as Vitamin A, B12, iron, choline and zinc. Increasing animal protein accessibility through livestock-based

interventions is therefore an ideal solution to these “hidden hunger” deficiencies plaguing much of the developing world.

To meet the ever-growing need for food while preserving the ecosystems we depend upon, humanity will need to innovate. Livestock systems must increase yield, decrease their environmental footprint, and make products accessible to those who need them most. Gambia Goat Dairy (GGD) will be the first commercial goat milking facility in The Gambia. We aim to achieve food security through environmentally sustainable interventions. We prioritize animal welfare and act on community-defined need as we work to solve one of the world's toughest problems.

## **The Gambia**

The Gambia is the smallest country in mainland Africa. Over one third of The Gambia’s population lives below the international poverty line, and 25% of the children of The Gambia under the age of 5 are either severely or moderately stunted due to undernourishment. While animal-sourced foods unequivocally benefit childhood nutrition and development, The Gambia’s livestock generally yield 30 times less than their counterparts in more developed countries. This disparity is linked to antiquated agricultural practices and infrastructure, poor livestock management strategies, and lack of access to veterinary care in the developing world. The majority of dairy products available in The Gambia are therefore imported from foreign producers and are too expensive for the most nutritionally vulnerable populations to access. Additionally, current means of livestock rearing in The Gambia are environmentally costly due to extensive land use and ecological damage by roaming herds that grow in size every year. The Gambia National Nutrition Agency and Ministry of Agriculture prioritize the transition towards highly productive sustainable livestock systems as an essential process in achieving affordable food security, creating wealth amongst smallholder farmers, reducing import reliance, and preserving its natural environment.

## **The Three Phase Plan**

### *Phase I – Pilot Project*

GGD’s pilot project is the creation of a small-scale goat dairy farm in The Gambia. It is an evidence-based start-up initiative that will become a self-funded nonprofit entity 5 years after inception. By this time, our goal is to provide 108,000 servings of protein per year to undernourished populations and generate a surplus of USD \$20,000 per year from the ongoing business operation. Phase I will cost between USD \$150,000 and USD \$200,000.

GGD will implement a sustainable livestock system that combines modern agricultural strategies with equipment and practices tailored to the unique environment of West Africa. This will maximize the productivity of endemic goat breeds in a replicable dairy model that can be easily

adapted to operations elsewhere in The Gambia and in neighboring countries. The pilot project will test sales strategies that target multiple market segments, ensuring that high quality protein products reach the populations that need them most. Throughout this phase, GGD will work closely with local smallholder farmers to leverage community assets and develop robust supply chains to achieve proof of concept. Social impact and agricultural tactics will be continually assessed to direct decision-making and ensure accountability and project efficacy. These findings will contribute greatly to the current body of literature addressing strategies for livestock development initiatives and global food security.

#### *Phase II – Extension Service Establishment*

In this phase, GGD will prioritize outreach and inclusion of Gambian smallholder dairy farmers. We will adapt our pilot project findings to fit the needs of smallholder producers and prescribe GGD's techniques to their herds. Phase II will take 5 or more years and cost between USD \$500,000 and USD \$1,000,000.

GGD's Extension Service will engage in husbandry education and smallholder farm financing programs, explore options in bovine production systems, train and employ veterinary paraprofessionals, design crop residue exchange agreements, build pasteurization cooperatives, and research and plan more extensive supply and value chains. It involves extensive, ongoing research into livestock productivity, outreach strategies, venture scaling, nutritional impact, demand, and product development. GGD's Extension service lays the groundwork necessary for the success of Phase III.

#### *Phase III – Dairy Industry Establishment*

Upon widespread adoption of GGD's production techniques, The Gambia's dairy farms will be poised to progress towards the establishment of larger dairy operations that achieve economies of scale. Phase III will take 10 or more years and cost over USD \$1,000,000.

With a network of highly productive Gambian dairy farmers generating a steady supply of dairy, GGD will transition from its role as a producer to that of a processing and distribution center. As a national dairy cooperative, GGD will purchase dairy products from Gambian farmers for processing and product distribution. GGD's ultimate goal is to provide The Gambia's children with 25% of their total protein requirement by creating a stable domestic dairy sector.

#### **The Project to Date**

GGD was conceived in 2016 with collaboration between The Rotary, The University of Pennsylvania School of Veterinary Medicine, The Bwiam General Hospital, and Power Up Gambia. An eight-week feasibility assessment was conducted in The Gambia in 2016 during which all

relevant stake-holding organizations were consulted to establish whether a commercial goat dairy would succeed in The Gambia. The comprehensive business plan was developed and revised by an advisory committee in the Gambia and in The United States. The Gambian committee included individuals representing The National Nutrition Agency, The Department of Agriculture, The Ministry of Health, The National Environmental Agency, private farmers, private veterinarians, and other key stakeholders. The US committee included experts in global health and international development, livestock productivity, veterinary medicine, and agricultural economics. The plan addressed human and animal nutrition, breeding, husbandry, veterinary care, farm infrastructure, dairy processing, biosecurity, labor, community assets, revenue generation, marketing, sustainability, and environmental impact. In early 2017, GGD prioritized publicity and grant procurement. Funding for this project has come from The University of Pennsylvania School of Veterinary Medicine, Penn Abroad, and The Rotary. Later in 2017, a Gambian livestock expert was identified and hired as GGD's Herd Manager. GGD secured a 9.6-acre plot of land on which to begin construction of the dairy in 2018.

### **The Role of the Veterinarian**

Veterinarians sit at a unique interface at which they have the ability to create change that betters the health of humans, animals, and our shared environment. Understanding animal disease as well as health and productivity lends to a distinctive approach in overcoming the multifaceted barriers to achieving food security. Applying scientific and systems thinking to far-reaching problems and prescribing effective strategies for change is an occupational strength of veterinarians and will be a valuable asset to Gambia Goat Dairy.

GGD's advisory teams in The United States and The Gambia are both led by veterinarians. These individuals were carefully selected for their extensive knowledge of and experience with livestock production systems, disease prevention, wealth creation, laboratory and clinical research, social entrepreneurship, environmental science, and human nutrition. The on-site project work to date has been completed largely by two senior veterinary students from The University of Pennsylvania. This team's expertise will allow GGD to plan effectively and identify challenges that smallholders face early in the pilot project, as well as overcome them efficiently. GGD's strength stems from its ability to integrate information from vastly different sources, spanning many disciplines and communities around the world. The project's future success has widespread implications for the role of livestock in international development and the role of veterinarians in global health.