Opportunities for Dairy Goat Farming in Tobago

Thursday 13 March 2014
Presented by John Borely
EUROCHAMTT Tobago Good Foods Project
Goat Milk; its Value, and its Potential
Goat Milk in the World

- More people drink the milk from goats than from any other animal
- 440 million goats produce an estimated 4.8 million tons of milk
- Predominantly consumed locally
- Processed into various types of cheese
- Interest in the goat is growing worldwide, in both high and low income countries
On a global scale, goat milk production represents about 2% of total milk production. Over the past decade, production has fluctuated between about 11.4 and 12.4 billion tonnes while, in recent years, production has remained fairly stable.
Table 1: Major Goat Milk Producers (2004)

<table>
<thead>
<tr>
<th>Country</th>
<th>Goat Milk Production (Mt)</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>2,760,000</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>1,328,000</td>
</tr>
<tr>
<td>Sudan</td>
<td>1,295,000</td>
</tr>
<tr>
<td>Pakistan</td>
<td>658,000</td>
</tr>
<tr>
<td>France</td>
<td>552,750</td>
</tr>
<tr>
<td>Spain</td>
<td>455,000</td>
</tr>
<tr>
<td>Greece</td>
<td>450,000</td>
</tr>
<tr>
<td>Iran, Islamic Republic of</td>
<td>365,000</td>
</tr>
<tr>
<td>Turkey</td>
<td>280,000</td>
</tr>
<tr>
<td>Russian Federation</td>
<td>275,000</td>
</tr>
</tbody>
</table>

Source: FAOSTAT data, 2005
Goats milk the new superfood!

Researchers at the University of Granada have found that goat milk has nutritional characteristics beneficial to health. They have determined that goat milk has many nutrients that make it similar to human milk.

The research group AGR 206 at the University of Granada Department of Physiology and Institute of Nutrition and Food Technology "Jose Matáix," coordinated by professor Margarita Sánchez Campos, have proven that goat milk has nutritional characteristics beneficial to health.
COW'S MILK vs. GOAT'S MILK

The winner: Goat's milk
When Spanish researchers compared cow's and goat's milk from animals raised under similar conditions, they found that both have the same amount of essential amino acids needed to repair and build muscle. But goat's milk contains a larger percentage of omega-3 fats, as well as calcium, phosphorus, magnesium, and conjugated linoleic acid (or CLA). Studies suggest CLA has a number of effects, including lowering cancer risk, improving bone health, and helping reduce body fat.

HEALTHY CHOICE: Use tangy, slightly sweet goat's milk (found at health-food stores) the same way as cow's milk—on cereal, in smoothies, and when baking.
# Goat & Cow Milk Prices Compared

<table>
<thead>
<tr>
<th>Country/region</th>
<th>Price (Euro/l)</th>
<th>Solid (g/l)</th>
<th>Price/ g solid (Euro/100 g)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Spain</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cow Milk</td>
<td>0.292</td>
<td>66</td>
<td>0.442</td>
</tr>
<tr>
<td>Average Goat Milk</td>
<td>0.412</td>
<td>85</td>
<td>0.499</td>
</tr>
<tr>
<td><strong>France</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cow Milk</td>
<td>0.32</td>
<td>70</td>
<td>0.46</td>
</tr>
<tr>
<td>Average Goat Milk</td>
<td>0.471</td>
<td>63</td>
<td>0.747</td>
</tr>
<tr>
<td><strong>Greece</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cow Milk</td>
<td>0.39</td>
<td>70</td>
<td>0.55</td>
</tr>
<tr>
<td>Goat Milk, Epirus</td>
<td>0.53–0.55</td>
<td>90</td>
<td>0.59</td>
</tr>
<tr>
<td><strong>Tunisia</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cow Milk</td>
<td>0.31</td>
<td>65</td>
<td>0.48</td>
</tr>
<tr>
<td>Average Goat Milk</td>
<td>0.35–0.39</td>
<td>90</td>
<td>0.38–0.40</td>
</tr>
</tbody>
</table>
Along with greater interest in goat farming, has come an increase in commercial goat farming operations. Fewer but bigger farms seem to be the trend for the 21st century in all agriculture and agri-food industries in Canada.

With respect to the goat industry, the most recent Census of Agriculture shows that although the number of goat farms decreased 11.6% between 1996 and 2001, the total number of goats increased by 45% over that same period.
The Local Situation

- Local production of goat milk is increasing
- New farmers are bigger and focused on developing markets
- Consumers are following global trends and recognizing role of goat milk in good nutrition and cuisine
- The support system for dairy goats is better than ever before
  - Recognised sector
  - Incentives
  - Institutional support
Evolution of Milk Consumption in Trinidad and Tobago (1962 - 1978)

Source: Williams, Wilson, Timothy, Carr and Rose (1985)

<table>
<thead>
<tr>
<th></th>
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<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Local Fresh Milk - Sterilized/ UHT ('000 litres)</td>
<td>200 (-%)</td>
<td>873 (2%)</td>
<td>5719 (8%)</td>
<td>6369 (9%)</td>
<td>6001 (5%)</td>
<td>6137 (6%)</td>
</tr>
<tr>
<td>Sweetened Condensed Milk ('000 cases)</td>
<td>354 (44%)</td>
<td>347 (39%)</td>
<td>323 (27%)</td>
<td>360 (29%)</td>
<td>371 (18%)</td>
<td>375 (19%)</td>
</tr>
<tr>
<td>Evaporated Milk ('000 cases)</td>
<td>105 (11%)</td>
<td>150 (13%)</td>
<td>171 (12%)</td>
<td>220 (15%)</td>
<td>363 (15%)</td>
<td>300 (12%)</td>
</tr>
<tr>
<td>Full Cream Powdered Milk ('000 kilo)</td>
<td>2,714 (45%)</td>
<td>3,154 (46%)</td>
<td>4,650 (53%)</td>
<td>4,330 (47%)</td>
<td>9,229 (62%)</td>
<td>9,500 (63%)</td>
</tr>
<tr>
<td>Equivalent in Full Cream Milk ('000 litres)</td>
<td>45,939 (100%)</td>
<td>51,663 (100%)</td>
<td>67,449 (100%)</td>
<td>70,072 (100%)</td>
<td>114,805 (100%)</td>
<td>113,750 (100%)</td>
</tr>
</tbody>
</table>
Local Goat Milk Production is Growing

<table>
<thead>
<tr>
<th>Farmer name</th>
<th>Number of goats in milk</th>
<th>Milk production</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2008</td>
<td>2012</td>
</tr>
<tr>
<td>Liaquat Ali</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>Rudolph Bahadoo</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Colin Barcant</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Wayne Bowen</td>
<td>0</td>
<td>15</td>
</tr>
<tr>
<td>Winston Fermin</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Foster Frampton</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Lindsay Gay</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>Stephen Jarvis</td>
<td>8</td>
<td>15</td>
</tr>
<tr>
<td>Harrilal Kaloo</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Nigel Khan</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Shiraz Khan</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>John Macoon</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Seuicharan Ramsingh</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>Josefa Patience</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Earl St Hill</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Soonil Sookoo</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>Lincoln Thackorie</td>
<td>0</td>
<td>150</td>
</tr>
<tr>
<td>Centeno Livestock Station</td>
<td>0</td>
<td>11</td>
</tr>
</tbody>
</table>

| Total               | 150  | 334  | 178  | 622  |
Goat Milk Sales at a Supermarket Franchise (Trinidad) in 2010

Litres of Goat's Milk Sold

Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec
--- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | ---
0   | 20  | 40  | 60  | 80  | 100 | 120 | 140 | 120 | 100 | 80  | 60  | 40  | 20  | 0   

East
West
South
Goat Milk Sales at a Supermarket Franchise (Trinidad) in 2011

Litres of Goat's Milk Sold

- East
- West
- South

Jan Feb Mar Apr May June July Aug Sept Oct Nov Dec
Getting to Know the Goat
GET TO KNOW THE GOAT

The Goat is a quite unique animal. While some of its behavioural characteristics are quite similar to other farm-yard ruminants there are some quite important behavioural differences that the farmer should be aware of. It is these unique aspects of the goat species that must be understood so that the farmers management system is not at odds with the natural ways of the flock. Getting to know the goat will help the farmer in two ways:

1. He will be able to provide a more efficient management system deriving greater economic benefits.

2. He will cultivate an enhanced understanding and enjoyment of the species.
Social Behaviour of Goats

- Goats live in freer, smaller groups than sheep.
- Separation from the herd does not present as much of a stress for goats as it does for sheep.
- When threatened with a predator or other danger, goats do not crowd in a herd. Conversely, they run in all directions.
- Goats are uncommonly curious
- Goats develop a social hierarchy based on seniority
- Goats can be led, not herded
The basic requirements for the welfare of goats are:

1. Food and water to sustain health and vitality;
2. Sufficient space to provide freedom to stand, lie down, stretch, turn around and groom themselves;
3. Protection from predation;
4. Protection from disease, including disease that can be exacerbated by management;
5. Protection from extremes of climate during certain phases of their life; and
6. Protection from pain, suffering and injury.

**Milking Practices - Dairy Goats**
Lactating dairy goats in full lactation should not be left for more than 24 hours without relief by milking.
Introducing the Dairy Goat

The Production Cycle/System

- **Birth Weight**: 2.5 – 3kg
- **Age at First Service**: 6 – 7 months
- **Wght at First Service**: 40 kg
- **Age of 1st Lambing**: 12 months
- **Length of Lactation**: 300 days
- **Gestation Length**: 5 months
- **Ave Lactation Production**: 700 – 1000 kg
- **Ave. Daily Doe Milk Production**: 2 to 3 kgs/day
- **Number of Kiddings/Year**: 1
- **Number of Lactation/Year**: 1
Seasonality of Demand for Local Goat Cheese
Food and Drug Regulations of T&T (1969)

Milk is “the normal lacteal secretion obtained from the mammary gland of the cow, genus Bos, and shall be free from colostrum, and shall contain: (a) not less than 3.0 percent of milk fat; (b) not less than 8.5 percent of milk solids not fat; (c) not more than 20 parts per million dirt (by dirt means all matter insoluble in, and foreign to milk as it leaves the cow’s udder). The milk of animals other than bovine species shall be given a designation appropriate to its source”.
Fresh normal goat milk, i.e. milk obtained from properly fed and milked animals, is a white, opaque liquid with a slightly sweet taste which, if correctly drawn and stored, has practically no odour. Normal milk is the whole product of the complete, uninterrupted milking of a healthy, well fed, unfatigued animal (La Jaouen, 1987).

493 L of blood per litre of milk pass through the udders of lactating goats supplying all the metabolites needed for the formation of various components of milk (La Jaouen, 1987).
The Routine

- Over 95% of the farmers' time is spent on production related activity

- Activities include:
  - Cleaning
  - Animal health and care routines
  - Feeding
  - Birthing
  - Milking
  - Recording
The Skills Needed

- Milking technique
- Hoof trimming
- Recognizing Healthy Animals
- Recognizing Quality Producers/Breeding Stock
- Health practices - injections, drenching
- Recognizing Quality Forage
PROPER MILKING PROCEDURES

1. Washing the Doe's Udder before Milking

2. Massaging Udder for More Milk

3. Trapping Milk in Teat by Clamping at Top with Thumb and Index Finger

4. Squeezing Milk Down by Adding Lower Fingers
   - Do Not Squeeze Thumb and Index Finger

5. All Fingers Squeezing First Scrape into the Test Cup

6. Do Not Milk Like This
HOOF TRIMMING......

TOOLS...

foot rot shears or pruning shears and utility knife

ANATOMY...

TOE WALLSOLE HEEL LEVEL rhomboid shape

dewclaw

HOOF

DIG OUT DIRT WALL HEEL

TRIM WALLS TRIM HEELS

OVERGROWN

if the hoofs are trimmed regularly the job is much easier

TRIM EXCESS HOOF GROWTH

if the goat bleeds use some iodine and make sure the animal’s tetanus booster is up to date

PROPER TRIM
Shaping a perfect goat

The shape, or conformation, is evaluated based on a set of ideal criteria for the breed. The right physical structure can ensure many years of high-volume milk production. Kevin Weaver’s Alpine Goat named Weavers L’Avenir Sunshine scored 91, in the Excellent category. Here’s a look at how the scores break down.

**DAIRY STRENGTH**
- Accounts for 22 per cent of overall score.
- Our goat got 91.
- Includes traits such as chest width and height at front end.

**RUMP**
- Accounts for 10 per cent of total score.
- Our goat got 93.
- Includes traits such as loin strength and rump angle.

**MAMMARY SYSTEM**
- Accounts for 42 per cent of overall score.
- Our goat got 90.
- Includes traits such as udder texture, teat placement, and teat length.

**FEET AND LEGS**
- Accounts for 26 per cent of score.
- Our goat got 88.
- Includes traits such as foot angle, bone quality, and locomotion.
Critical Success Factors

- Which Goats?
- Proper Milk Handling
- Maintaining Health
- Driving Performance
## Which Goats?

### Milk Production by Breed

<table>
<thead>
<tr>
<th>BREED</th>
<th>YEARLY MILK PRODUCTION (LBS.)</th>
<th>BUTTER-FAT (%)</th>
<th>PROTEIN (%)</th>
<th>TYPICAL MILK COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALPINE</td>
<td>2396</td>
<td>3.3</td>
<td>2.8</td>
<td>MILK TASTE CAN VARY</td>
</tr>
<tr>
<td>LA MANCHA</td>
<td>2246</td>
<td>3.9</td>
<td>3.1</td>
<td></td>
</tr>
<tr>
<td>NUBIAN</td>
<td>1835</td>
<td>4.6</td>
<td>3.7</td>
<td>SWEET TASTING MILK</td>
</tr>
<tr>
<td>OBERHASLI</td>
<td>2256</td>
<td>3.5</td>
<td>2.9</td>
<td>STRONGER TASTING MILK</td>
</tr>
<tr>
<td>SAANEN</td>
<td>2545</td>
<td>3.2</td>
<td>2.8</td>
<td></td>
</tr>
<tr>
<td>TOGGENBURG</td>
<td>2047</td>
<td>3.0</td>
<td>2.7</td>
<td>STRONGER TASTING MILK</td>
</tr>
<tr>
<td>NIGERIAN DWARF</td>
<td>729</td>
<td>6.1</td>
<td>4.4</td>
<td>RICHEST TASTING MILK</td>
</tr>
</tbody>
</table>

*ADGA (AMERICAN DAIRY GOAT ASSOCIATION) BREED AVERAGES (2010)*
Reasons for keeping goats

- **Meat Production**
  - 1st domesticated farm animal
  - universally known as a foster mother
  - poor man’s cow
  - very adaptable
  - superior quality milk
  - milk producing machine
  - highly sought after meat

- **Milk Production**
British Saanen

- white goat but may have freckles
- have longer legs and are heavier than the Saanen
- calm natures with high yields and long lactations
- high production of liquid milk throughout the year
British Toggenburg

- brown goat with white Swiss markings
- have sound dairy conformation and are strong and robust, having good longevity
- used in some commercial goat farms where cheese is a main product
British Alpine

- Black with white Swiss markings
- highly individual in character
- British Alpines generally have long lactations
Anglo Nubian

- Roman nose and long drooping ears
- Large number of colour variations
- High butterfat- milk is ideal for yoghurt and cheese making
- Well suited to meat production, both in its own right and when crossed
Temperature Humidity Index (THI) = \( T - (0.55 - (0.55 \times \text{RH}/100)) \times (T - 58) \)

Emergency conditions exist when greater than 84 during the day with night values remaining above 70.

Great Plains Veterinary Educational Center (GPVEC)

http://gpvec.unl.edu/HeatDrought/heat.asp
A Check List for Investigating Goat Milk Taints

1. Check whether goat has clinical mastitis. Call your vet.
2. Check milking technique and dairy hygiene.
3. Check whether taint is due to oxidation.
4. Feed goat with concentrates/pellets only and see if taint disappears (allow 24-48 hours).
5. Worm goat. If due to worms, taint should disappear within a week and often sooner.
6. Investigate possibility of a cobalt deficiency, especially if in a known cobalt deficient area.
7. Check whether subclinical mastitis may be a cause. This may involve prolonged treatment with antibiotics. Talk to your vet.
Milk Handling

- Variability in Milk
- Milk Extraction
- Post harvest Handling
Haemonchus contortus
(Barber Pole Worm)
Infestation in Goats
Maintaining Health

- Where are your goats from?
- Natural environment
- What are they inclined to do?
- Exercise...legs and diet
- Designing Pens
Parasite control begins with good management and common sense

- Good sanitation
- Feeders which prevent wastage and contamination.
- Clean water, free from fecal matter.
- **Not overstocking pens and pastures.**
- Isolation and deworming of new animals.
Alternative forages

- Livestock that browse have fewer parasite problems.
- Livestock grazing tall-growing forages will have less parasite problems.
  - 80% of parasites live in the first 2 inches of the vegetation.
- Grazing high-tannin forages may reduce the effects of parasitism.
Genetics and worms
Two important traits: resistance and resilience

**Resistance**
- Ability of host to limit infection
- Assessed by fecal egg counts (FEC)

**Resilience**
- Ability of host to withstand challenge and/or infection, and thus maintain health and productivity.
- Assessed by blood hematocrit/packed cell volume (PCV) and eye anemia score.

Moderately heritable – 20-40 percent
“Resistant” Breeds
Some sheep and goat breeds are more resistant to worms.

Sheep
- Gulf Coast Native
- Hair sheep
  - Barbados
  - Blackbelly
  - St. Croix
  - Katahdin
  - Dorper (?)
  - Royal White (?)

Goats
- Spanish/Brush
- Myotonic/Tennessee
- Pygmy
- Kiko (?)

NOT
- Traditional wooled breeds
- Boer goats
- Dairy goats
- Angora goats
- Savannah????
“Resistant” Individuals
Parasite resistance varies between individual animals of the same breed type.

- 20-30 percent of flock shed most of the parasite eggs.
- Focusing deworming on susceptible animals will significantly reduce pasture contamination.
- Culling worm-susceptible animals will increase flock resistance and reduce pasture contamination.
Three drug families

1) **Benzimidazoles**
   Chemical name ends in '.dazole'
   Fenbendazole, Albendazole, Oxybendazole

2) **Nicotinics**
   Levamisole, Morantel, Pyrantel

3) **Macrolides**
   Avermectins
   Ivermectin, Doramectin Moxidectin
Benzimidazoles – “white drenches”

- **Fenbendazole** – SafeGuard®, or Panacur®
- **Albendazole** – Valbazen®
- **Oxyfendazole** – Synantic®

- Broad spectrum
- Wide margin of safety
- Effective against tapeworms
- Valbazen
  - Effective against adult liver flukes.
  - Should not be administered to pregnant animals.
Anthelmintic Resistance

How to measure

- Fecal Egg Count Reduction Test (FECRT)
  - Fecal egg count before deworming
  - Fecal egg count 7-10 days after deworming
- DrenchRite® (Univ. of GA)
  - Larval assay

Drug resistance

- < 90 % egg reduction

Severe Resistance

- < 60 % egg reduction

** Caused by overuse and misuse of drugs. **
Slowing down drug resistance

- **DO NOT** overuse drugs, especially Levamisole and Moxidectin.
- **DO NOT** introduce resistant worms to your farm
  - Isolate new animals and deworm them aggressively
- **DO NOT** underdose
  - Weigh animals or dose for heaviest animals in group.
- **DO NOT** rotate dewormers after each treatment
  - Rotate dewormers annually
  - Rotate among drug families
  - Use specific dewormers for specific situations.
- **DO NOT** treat everybody
  - Leave some animals untreated
Parasite control requires an integrated approach.

- Clean Pastures
- Genetic selection
- Strategic deworming
- Good nutrition
- Pasture Rest and Rotation
- Mixed species grazing
- Good management
- Proper Anthelmintic Use
- Browsing
- Fecal egg counts
- FAMACHA®/Selective Deworming
- Manage anthelmintic resistance
- Alternative forages
- Resistant breeds
- Zero grazing
Driving Performance

- Understanding maintenance
- Understanding production
- Understanding forage quality
- Formulating diets
- Using the tools
<table>
<thead>
<tr>
<th>Dairy meal rations for a dairy goat</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry female</td>
<td>0.5kg</td>
</tr>
<tr>
<td>Female milking 1 litre</td>
<td>1.0 kg</td>
</tr>
<tr>
<td>Female milking 2 litres</td>
<td>1.5 kg</td>
</tr>
<tr>
<td>Female milking 3 litres</td>
<td>2.0 kg</td>
</tr>
<tr>
<td>Female milking 4 litres</td>
<td>2.5 kg</td>
</tr>
<tr>
<td>Female milking 5 litres</td>
<td>3.0 kg</td>
</tr>
</tbody>
</table>
Dairy Goats are Ruminants

- **Rumen:**
  - large vat with micro-organism, chewing cud – when food move back to the mouth

- **Reticulum:**
  - contain micro-organism break down food into simple chemicals

- **Omasum:**
  - Food particle and water move from rumen and reticulum, most of the water is remove

- **Abomasum:**
  - true stomach, very acidic, digestion is speeded up by enzymes
Factors that affect feeding Goats

Food factors
- taste
- smell
- variety
- moisture content
- digestibility
- size/form of feed

Presentation factors
- feeding time
- frequency of fresh feed
- quantity offered
- competition from other goats
- temperature (shade)
- humidity
- method of presenting feed

Goat factors
- appetite
- preference
- size
- pregnancy
- growing
- lactating
## Comparing Feeding Systems

### **Grain vs. Grass**

<table>
<thead>
<tr>
<th>Grain</th>
<th>Grass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Faster growth rates</td>
<td>More natural</td>
</tr>
<tr>
<td>Meat is more tender and</td>
<td>Leaner meat</td>
</tr>
<tr>
<td>has less intense flavor and</td>
<td>- Less saturated fat</td>
</tr>
<tr>
<td>aroma (preferred in</td>
<td>- More Omega-3 FA</td>
</tr>
<tr>
<td>consumer panel taste tests)</td>
<td>- More CLA</td>
</tr>
<tr>
<td>Less problems with internal</td>
<td>- More protein and beta</td>
</tr>
<tr>
<td>parasites, predators,</td>
<td>carotene</td>
</tr>
<tr>
<td>poisonous plants, etc.</td>
<td></td>
</tr>
<tr>
<td>Can monitor lambs and</td>
<td>More problems with</td>
</tr>
<tr>
<td>kids more closely</td>
<td>internal parasites,</td>
</tr>
<tr>
<td></td>
<td>predators, and poisonous</td>
</tr>
<tr>
<td>More labor</td>
<td>plants</td>
</tr>
<tr>
<td>More expensive ???</td>
<td>More pasture needed</td>
</tr>
<tr>
<td>Better prices ????</td>
<td>Better pasture management</td>
</tr>
<tr>
<td></td>
<td>needed</td>
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<tr>
<td></td>
<td>Less expensive ???</td>
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</table>
Making it a Success
Guaranteed Markets - A Case Study
Efficiency in Scale

Family Farm vs Factory Farming
Innovation & Mechanization

- Labour pools
- Milking machines
- Cluster groups
- Cooperative activity
- ICT use
- National recording system
- National Farm Certification System
Specialized Goat Milking Machines
Organization

TTGSS Dilemma
- Who is represented?
- Production vs Marketing activity
- Advocacy issues
- Industry accountability
- Who takes the lead?
- PPPs
- Integrating the industry
Important Records to Keep in Dairy Goat Production

- Name/ Identification (Goat and Breeder)
- Lineage/ Breeding Records
- Birth Date
- Number of Siblings/ Identification
- Productive Longevity
- Yield
- Health/ Management Issues
- Linear Appraisal
### Heritability of some traits

<table>
<thead>
<tr>
<th>Species</th>
<th>Trait</th>
<th>% heritability</th>
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<tbody>
<tr>
<td>Dairy Cattle</td>
<td>Milk yield</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>Percent Protein</td>
<td>25</td>
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<tr>
<td></td>
<td>Percent Fat</td>
<td>25</td>
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<tr>
<td></td>
<td>Birth Weight</td>
<td>40</td>
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<tr>
<td></td>
<td>Fertility (services/conception)</td>
<td>5</td>
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<tr>
<td>Sheep</td>
<td>Weaning Weight</td>
<td>30</td>
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<tr>
<td></td>
<td>Fertility (Multiple Births)</td>
<td>20</td>
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<tr>
<td></td>
<td>Weight of Retail Cuts</td>
<td>40</td>
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</table>
# DAIRY GOAT RECORD KEEPING GUIDE

Name: ..........................  Registration No: ..................  Date of Birth: ..................  Breeder: ..........................


Name (Sex) of Siblings  1: .......................... ( )  2: .......................... ( )  3: .......................... ( )  4: .......................... ( )

<table>
<thead>
<tr>
<th>PARENTS</th>
<th>REG NO</th>
<th>GRANDPARENTS</th>
<th>REG NO</th>
<th>GREAT GRAND PARENTS</th>
<th>REG NO</th>
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<tbody>
<tr>
<td>SIRE</td>
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<td>G.D.</td>
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## MILK RECORDED YIELD

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<th>Date Kidled</th>
<th>Date Dried Off</th>
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<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>Days in Milk</th>
<th>Total Production to Date</th>
<th>Remarks</th>
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</tbody>
</table>
Coordinating a recording system

Producer records
- Milk yield
- Pedigrees
- Other data

Laboratory analyses milk
- Fat
- Protein
- Cell count

Genetic service provider
- Maintains database
- Calculates breeding values
- Calculates benchmarking data

Coordinator

Data flow between the main parties in a National breeding program
Marketing, Promotion & Branding

- Value Chain Development
- Local, Fresh, Zero Carbon Miles
- Family Farms
- Raw Milk vs Pasteurized
- Grass-fed, Organic
- Heart Healthy
- UpMarket, Green Markets
- Sophisticated Markets vs pet markets
A Campaign for Real Milk

FULL-FAT
PASTURE-FED
UNPROCESSED

By the Weston A. Price Foundation

A Campaign for Real Milk Is a Project of The Weston A. Price Foundation
Westonaprice.org

This document is posted at realmilk.com.
Updated April 13, 2008
Toward Sustainability....
<table>
<thead>
<tr>
<th>Problems</th>
<th>Causes</th>
<th>Why?</th>
<th>Details</th>
<th>Opportunities</th>
<th>Solutions</th>
<th>Who?</th>
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<tr>
<td>Low Milk Supply</td>
<td>Low Animal Output</td>
<td>Housing Environment</td>
<td>TH high/reduced performance</td>
<td>Survey of housing</td>
<td>Redesign housing systems</td>
<td>UW</td>
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<td>Underfed (quantity and quality)</td>
<td>Feeding not based on milk production</td>
<td>Lifecycle feeding education</td>
<td>Feeding guide</td>
<td>ETIS/NFM/</td>
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<td>Feed diluted with local by-products</td>
<td>Feed formulation education</td>
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<td>UW/Research</td>
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<td>Genetic Depression</td>
<td>Pedigree not recorded</td>
<td>Importation/Handbook</td>
<td>Breeding Plan/Handbook</td>
<td>UT/AF/H</td>
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<td></td>
<td></td>
<td>Good Genetics/Poor selection strategy</td>
<td>Need to be performance based</td>
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<td>ETIS</td>
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<td>Udder Health</td>
<td>Mastitis is not stringent monitored</td>
<td>Milk survey</td>
<td>Milking guide</td>
<td>Carg/Nestle</td>
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<tr>
<td>Low Farm Output</td>
<td>Kid Rearing Demands</td>
<td>160 L Milk @ $2500-$3000 to 3 months</td>
<td>Economic analysis of system</td>
<td>Kid rearing specialists</td>
<td>4-H/ETIS</td>
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<td>Farm Composition</td>
<td></td>
<td>1/2 herd Milking Does</td>
<td>Economic analysis of system</td>
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<td>ETIS/AP&amp;H</td>
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<td></td>
<td>Kids kept as breeding stock not meat</td>
<td>Change of attitude</td>
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<td>Low Milk Demand</td>
<td>Inconsistent Supply</td>
<td>Seasonal Breeding</td>
<td>Temperate Goats</td>
<td>Breed consultation</td>
<td>Some tropical stock used/Anglos</td>
<td>AP&amp;H</td>
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<td>Small Farm</td>
<td>Farm Animal Composition</td>
<td>Shared Marketing/Promotion</td>
<td>Co-operative effort</td>
<td>TTGS</td>
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<td>Seasonality of Demand</td>
<td>High End Gourmet Markets</td>
<td>Consumer survey</td>
<td>Consumer education/Marketing</td>
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<td>Milk as Medicine</td>
<td>High season</td>
<td>Consumer survey</td>
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<td>Buy for specific product then stop</td>
<td>Consumer survey</td>
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<td>Shelf Life of Product</td>
<td>Raw vs Pasteurized</td>
<td>Sold fresh for immediate consumption</td>
<td>Promotion of ecological image</td>
<td>Carg/Nestle</td>
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<td></td>
<td>Pasteurization/Urban farms</td>
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<td></td>
<td>Marketing/Promotion</td>
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<td>Milk vs Cheese/Yoghurt</td>
<td>Few farmers supply processors</td>
<td>Quality control/Production levels</td>
<td>Carg/ETIS/</td>
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<td>Montana milk marketing board</td>
<td>LLPB</td>
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<td>Profitability of Farm</td>
<td>Niche Market Access</td>
<td>Market Geographically Confined</td>
<td>Farmgate Marketing</td>
<td>Buy local/Ecological image</td>
<td>&quot;Know Your Farmer&quot; campaign</td>
<td>AST/LLPB</td>
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<td>High Cost of Inputs</td>
<td>Grain Prices</td>
<td>Local Inputs needed</td>
<td>Brewer's grain extensively used</td>
<td>Feed design/Training</td>
<td>NFM/Research</td>
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<td>Forage Costs</td>
<td></td>
<td>Browse not used/Local grass mainly</td>
<td>Rethink feeding paradigms</td>
<td>Trichetana/Mulbery Research</td>
<td>Research/SFC</td>
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<td>Dogs vs Humans</td>
<td>Dog breeders buy most of milk</td>
<td>Market positioning</td>
<td>Goat milk education program</td>
<td>Carg/ETIS</td>
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<td>Market Choice/Penetration</td>
<td>Management utilized</td>
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<td>Promote opportunity</td>
<td>Goat specific business opportunities</td>
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<td>Labour</td>
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<td>Less Focus on Marketing</td>
<td>Marketing means more money</td>
<td>Train farmers in marketing</td>
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<td>Ecological Image</td>
<td>Image is everything</td>
<td>Ecologically appealing farms</td>
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<td>Less focus on information seeking</td>
<td>Make Information accessible</td>
<td>Information access</td>
<td>AST/LLPB</td>
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<td>Hard to Acquire Capital Venture</td>
<td>Hard to Acquire Capital Venture</td>
<td>Record keeping/Budgeting</td>
<td>Jarvis example</td>
<td>Land Regulation for Small Farmers</td>
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<td>Lack of Institutional Support</td>
<td>Size of Industry</td>
<td>Critical Mass of Farmers</td>
<td>Lack of political clout</td>
<td>Lack of Institutional Co-operation</td>
<td>Establish communication channels</td>
<td>TTGS</td>
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<td>Critical Mass of Animals</td>
<td>Can't support private vet interest</td>
<td>Nigerian Dwarf goats</td>
<td>Goats for all purposes/Pets</td>
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<td>Economic Contribution Understated</td>
<td>Lack of Communication</td>
<td>TTGS Fragmented</td>
<td>Piece meal support</td>
<td>Strategic plan delivered</td>
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<td>Big Players not Represented</td>
<td>TTGS has little Respect/Clout</td>
<td>Needs of big producers/Symbiosis</td>
<td>Solicit membership of big farmers</td>
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<td>Regional phenomenon</td>
<td>Vets not well trained in goats</td>
<td>Goats bursary</td>
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<td>Service not well delivered</td>
<td>Redesign working arrangement</td>
<td>Holiday/Weekend Service</td>
<td>AP/H/RAN/RAS</td>
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<td>Ageing Industry</td>
<td>Youth Not Exposed to Goatkeeping</td>
<td>Globalization/Urbanization</td>
<td>4-H</td>
<td>Nurturing/Entrepreneurship</td>
<td>Youth Training/Involvement/Prizes</td>
<td>RAN/RA/ETIS</td>
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</tbody>
</table>

**Notes:**
- **UW:** University of Wisconsin
- **ETIS:** Extension Teaching for Indoor Swine
- **TTGS:** Teaching for Tree Growth Systems
- **AP&H:** Agriculture and Pennsylvania
- **NFM:** National Farm Management
- **ASST:** Agriculture and Science for Sustainable Technology
- **LLPB:** Livestock and Dairy Business Services
- **AST:** Agriculture and Science for Sustainable Technology
- **RAN:** Range Animal Nutrition
- **RAS:** Range Animal Science