Useful Facts:

Costa Rica- like many other regions in the tropics- has devoted much of its agricultural land to pastures and cattle production. In fact, more than half of the world’s cattle population resides in the tropics and subtropics. About 30% of Central America’s total land area is used for grazing with about 590 cattle per 1000 ha of grazing land. Forty-six percent of Costa Rica’s land is permanent pasture land which makes it one of the largest in Central America (Heath 1985:154-155). Cattle ranching in Costa Rica (as well as other Central American countries) jumped significantly during the 1970s/1980s as beef was highly valued by large countries including the U.S. Despite having large amounts of cattle and pastures, only 20-30% of the world’s beef is produced in the tropics. The above ratio of 590/1000 cattle per ha in Central America pales in comparison to the U.S. with 980 cattle per 1000 ha. This might not mean much if each cow was producing the same but those in the U.S. are producing much more than those of Central America (Heath 1985:154-155).

The inefficiency of cattle production in the tropics is, in part, due to the lack of nutrients in the tropical forage. Beef and dairy yields directly relate to the nutrient content of the forage available to the cattle. It is not that the species of grasses or cattle in the tropics is really to blame because many of these species can be found in more temperate zones. Forage in the tropics mainly suffers from less-than-desirable soil in the lowlands and some overall mismanagement issues such as over-grazing. These mismanagement issues are magnified at higher elevations where the soil is much more fertile and the environment is capable of producing high quality cattle. Forage at higher elevations also includes some legumes that add a lot of nutritional value to a cow’s diet. It is important to mention that many of the cattle farms visited on this Costa Rica trip are managed very well.

The cattle and grasses of Costa Rica differ depending on production value (dairy or beef) and elevation. The warm-season cattle (Bhraman, etc.) and warm-season grasses (Stargrass, etc.) reside in the hot low-lands and the cool-season cattle and grasses reside in the cool high-lands although this is not always the case. There are exceptions including the growth of stargrass at higher elevations which is not the best grass for the dairy cattle. Another exception is the practice of breeding the warm-season Brahman with the cool-season dairy Brahman to increase the milk production of the Brahman (EARTH and La Ensenada ranches practice this although they differ). Practically all the dairy cattle are cool-season breeds and will be found at the higher, cooler elevations (Dr. Parrott). Both cool-season (*Bos taurus*) and warm-season beef cattle (*Bos indicus*) can be found in Costa Rica. Some profiles of the cattle, grasses, and legumes found in Costa Rica can be viewed in the following pages.

According to Dr. Azain from UGA the average U.S. dairy cow produces around 18,000 lbs (8164 kgs) of milk per year. It is unclear what the average is for the Costa Rican dairy cow but Dr. Andrae and Dr. Parrott estimate no more than 1/3 that of the U.S. average. With the Costa Rican highlands providing such a conducive environment for dairy production it will be interesting to examine some of the reasons why rates per
animal unit is not much higher. Questions regarding this subject will be asked at EARTH. A list of useful terms has been included to help in observing the various cattle operations that exist in Costa Rica.

**Useful Terms:**

**Aftermath:** Recovery growth of forage plants after harvesting by either animal or machine.

**Animal Efficiency:** Animal productivity relative to feed use.

**Animal Unit:** One mature cow (454 kg) or the equivalent based upon average daily forage consumption of 12 kg dry matter per day.

**Animal-unit Month (AUM):** Amount of feed or forage required by an animal unit for one month.

**Continuous Grazing:** The grazing of a specific range or pasture by livestock throughout a year or grazing season. The term is not necessarily synonymous with yearlong grazing.

**Creep or Forward Grazing:** A system whereby suckling calves are allowed to graze ahead of their mothers through a gate or opening in the fence. Thus, calves have full access to the highest-quality pasture.

**Crude Protein:** All nitrogenous substances contained in feedstuffs (% crude protein = % Nitrogen x 6.25)

**Decreaser:** Forage (range) plant that gradually is replaced by other species in a stand.

**Dry Matter (DM):** Total amount of matter in a feed less the moisture it contains.

**Dry Cow:** A cow that does not produce milk.

**Forage:** Herbaceous plants or plant parts consumed by animal (generally, the term refers to such material as pasturage, hay, silage, dehy, and green chop in contrast to less digestible plant material known as “roughage.”

**Grass:** Botanically, any plant of the family Gramineae. Generally, in grassland agriculture the term does not include cereals when grown for grain but does include forage species of legumes often grown in association with grasses.

**Grazing Pressure:** The number of animals per unit area of available forage.
Green Chop: Mechanically harvested forage fed to animals while it is fresh and succulent.

Hay: Entire herbage of forage plants, sometimes including seed of grasses and legumes that is harvested and dried for feed.

Increaser: Forage plant on the range that spreads under existing management. Can include, but is not limited to, invasive species.

Legume: Plant member of the family Leguminosae, with the characteristic of forming nitrogen-fixing nodules on its roots, in this way making use of atmospheric N possible.

Lignin: Complex non-carbohydrate strengthening material in the thickened cell walls of plants; practically indigestible. Negatively associated with digestibility of forage.

Mixed Grazing: Grazing two or more classes of livestock, such as sheep and cattle, on the same pasture.

Native Forage: Grass and legume species indigenous to an area; not introduced from another environment or area.

Planted Forage: Grass and legume species introduced to an area; not indigenous to an area.

Rotational Grazing: System of pasture utilization embracing periods of heavy stocking followed by periods of rest for herbage growth recovery during the same season.

Silage: Forage preserved in a succulent condition by partial fermentation.

Stocking Rate: Number of animal units per unit of land area at a specific time.

Supplementation: Feed in addition to forage.

Total Digestible Nutrients (TDN): Sum total of all digestible organic nutrients, i.e., proteins, nitrogen-free extract, fiber, and fat. Fat is multiplied by 2.25 to put its energy value on the same basis as the other nutrients. On the average for all feeds 1 g of TDN = 4.4 kcal. A standard measure of energy content of feedstuffs.

Weaning Weight: The total weight of calves in a herd divide by the total number of calves. This is a basic formula used to keep track of productivity.
Nelore (*Bos Indicus*)

**Origin:**
- From the Ongele breed in India
- Brought to the Americas by the British in the mid 1800s.

**Production Value:**
- Warm-season beef
- A good beef cow that produces lean, but good tasting meat.

**General:**
- There are 5 million registered Nelore in the world.
- They are known for the very distinctive hump right behind the neck.
- Brazil has the highest percentage of Nelore.
- There will probably be no pure breeds in Costa Rica.

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Corriente (*Bos taurus*)

**Origin:**
- Brought to the Americas in 1493 by the Spanish.

**Production Value:**
- Cool-season dairy/beef
- Have been used for dairy and beef over the years but are now mainly being grown for beef.

**General:**
- There are not many purebreds of the Corriente that exist today but steps are being taken to preserve this specific breed.
**Indo Brazilian** (*Bos indicus*)

**Origin:**
- Developed in Brazil from 1910-1930
- Developed from the Gir, Kankrej, and Ongele breeds.

**Production Value:**
- Warm-season beef
- Well-adjusted to the tropics

**General:**
- Distinctive features include long ears and hump behind the neck similar to the Nelore.

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**Brahman** (*Bos indicus*)

**Origin:**
- Originally from India
- Developed from the Gir, Nellore, and Guzerat in the U.S.

**Production Value:**
- Warm-season beef although milk production is pretty good
- Very resistance to heat, insects, and other harmful elements of the tropics.

**General:**
- This is the sacred cow from India that is not eaten by the Hindu.
- The high resistance that characterize this breed are the result of many years of development in India.
Water Buffalo (*Syncerus caffar*)

**Origin:**
N/A

**Production Value:**
-Warm season, low cholesterol beef and also good for dairy

**General:**
-Is marketed as an exotic form of beef and good milk for cheese.
- Closer to *Bos* than bison.

Angus (*Bos taurus*)

**Origin:**
-Originally from Europe arrived in U.S. in 1873 from Scotland
-Associated with Aberdeen

**Production Value:**
-Cool season beef

**General:**
-One of the best known breeds in the world.
**Charolais** (*Bos taurus*)

**Origin:**
- From France

**Production Value:**
- Cool-season beef

**General:**
- Have been a bit more environmentally resistant than the British breeds
- A larger framed type that is good for beef producers.

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**Hereford** (*Bos taurus*)

**Origin:**
- From England

**Production Value:**
- Cool-season beef

**General:**
- Like the Angus and Charolais, the Hereford is able to produce beef under less-than-optimum conditions and, as a result, is popular.
**Holstein** (*Bos taurus*)

**Origin:**
- From the Netherlands

**Production Value:**
- Cool season dairy

**General:**
- Excellent milk production
- Known for their distinctive color patterns including black and white, as well as red and white.

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**Jersey** (*Bos taurus*)

**Origin:**
- From Island of Jersey, a British island off the coast of France

**Production Value:**
- Cool season dairy

**General:**
- Excellent milk production
- Popular around the world like the Holstein.
**Brown Swiss** *(Bos taurus)*

**Origin:**
- From Switzerland

**Production Value:**
- Cool season dairy

**General:**
- Another popular breed that produces milk very well.

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**Guernsey** *(Bos taurus)*

**Origin:**
- From the Isle of Guernsey, an island off the coast of France

**Production Value:**
- Cool season
Stargrass (*Cynodon aethiopicus*)

**Origin:**
- From eastern Africa
- Found in most tropical regions

**Production Value:**
- Warm season perennial grass
- Stargrass grows fast, is durable, and is resistant to short-term flooding.
- 1000-2000 kg/ha of dry matter per month in one study during the summer.
- Good for hay and grazing but not great

**General:**
- The best varieties are Florico and Florons.
- This will probably be seen a lot in Costa Rica.

Bahia Grass (*Paspalum notatum*)

**Origin:**
- Found mainly in the tropics and subtropics of America

**Production Value:**
- Warm season perennial
- Low yield reflected in Georgia study: 5000-7000 kgs/ha dry matter over 4 year period of time.
- Bad for hay.

**General:**
- Grows very fast in the tropical climate but does not yield enough dry matter to make it very valuable.
- It will be found in Costa Rica nonetheless.
**Elephant Grass** (*Pennisetum purpureum*)

**Origin:**
- Native to sub-tropical Africa
- Found in most tropical and sub-tropical regions

**Production Value:**
- Warm season perennial
- Prefers area of high rainfall
- Somewhat drought resistant
- Produces large yields of dry matter with a world record of about 85,000 kg/ha in one year (high-input).
  - Makes good hay
  - Can be grazed heavily

**General:**
- Overall a good, high-yielding grass that is known in Costa Rica “gigante” grass.

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**Signalgrass** (*Brachiaria brizantha*)

**Origin:**
- Native to tropical Africa
- Found in most tropical regions now

**Production Value:**
- Warm season perennial
- Good for grazing if accompanied by legume.
- With high input can produce dry matter yields of 6000-8000 kgs/ha per year.
  - Somewhat naturally resistant to weeds, and resistant to some drought.

**General:**
- Climate and pest resistance makes this good-yielding grass valuable.
Digit Grass ($Digitaria eriantha$)

**Origin:**
- Native to sub-tropical, southern Africa.
- Found in most tropical and subtropical regions now.

**Production Value:**
- Warm season perennial
- With high input can produce high yields that are able to tolerate a high stocking rate.

Bermuda Grass ($Cynodon dactylon$)

**Origin:**
- Found in most tropical and subtropical regions of the world.

**Production Value:**
- Warm season perennial
- Requires a lot of moisture but has good resistance to drought
- One Georgia study reported 1000-3000 kgs/ha of dry matter per month with high-inputs.

**General:**
- Will probably see some in Costa Rica but not much.
Tall Fescue (*Festuca arundinacea*)

**Origin:**
- From Europe
- Found in most cool regions of the world

**Production Value:**
- Cool season perennial
- Widely adapted grass

**General:**
- Widely known Kentucky-31 breed still exists today and although resistant is not good for grazing cattle.

Orchard Grass (*Dactylis glomerata*)

**Origin:**
- From Europe

**Production Value:**
- Cool season perennial
- Cultivated as a pasture grass
- Does well in shaded areas
Perennial Ryegrass (*Lolium perenne*)

**Origin:**
- Native to Europe, Northern Africa, and parts of Asia.

**Production Value:**
- Cool season perennial
- Has been developed for grazing

**General:**
- This along with the other cool season grasses will be found at higher elevations in Costa Rica.

Kikuyugrass (*Pennisetum clandestinum*)

**Origin:**
- Native to Zaire and Kenya but has been introduced to most tropical regions.
- The “grassland index” lists Costa Rica as one of the places where Kikuyugrass has been especially introduced.

**Production Value:**
- Warm season perennial
- Somewhat drought resistant due to long root system
- Dry matter yields are hurt by continuous grazing.
- Dry matter yields can reach the 10,000+ kgs/ha per year with high input.

**General:**
- Not the best grass for livestock but will be seen a lot in Costa Rica.

*The above are some of the types of grasses and cattle most likely to be seen in Costa Rica. The next couple pages profile some of the legumes that might be found among the pastures of Costa Rica.*
White Clover *(Trifolium repens)*

**Origin:**
-Native to Northern Europe

**Production Value:**
-Cool season legume
-Planted among pasture grasses to provide more nutritional value to the area.

**General:**
-Although valuable to some pastures, is often seen as a weed.

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Red Clover *(Trifolium pratense)*

**Origin:**
-Native to Europe

**Production Value:**
-Cool season legume
-Similar to White Clover and will be found at the higher elevations.

**General:**
-White clover more prevalent
**Alfalfa** (*Medicago sativa*)

**Origin:**
- From North Africa and the Middle East

**Production Value:**
- Cool season legume
- Excellent addition to pasture grass as the nutritional value is great.

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**Tropical Kudzu** (*Pueraria phaseoloides*)

**Origin:**
- Native to Asia and is now found in most tropical and subtropical regions.

**Production Value:**
- Cool season legume
- Can withstand heavy flooding and is overall very resistant
- Good for grazing and durable against grazing.
**Stylo** (*Stylosanthes guianensis*)

**Origin:**
- Native to tropical America

**Production Value:**
- Cool season legume
- Good for grazing, and provides some important nutrients to a pasture.

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**Perennial Peanut** (*Arachis pintoi*)

**Origin:**
- Native to Central Brazil
- Has been introduced worldwide

**Production Value:**
- Warm season legume
- Great for grazing

**General:**
- Seen almost everywhere in Costa Rica
- Plant as ground cover until cash crop is planted (ex. Pineapple farm)
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