Project Proposal Phase IIb

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When Cows are so detrimental to the environment, goats provide a great alternative. Coming down to meat production, goats generate per-kilogram emissions of around 23.8 kg CO2, meanwhile Cows produce 46.2 kg CO2 per kg of meat estimated by the United Nations Food and Agriculture Organization. With this stark contrast we wish to promote sustainability along with the Silvies valley ranch mission. By comparing the birth weights every year and looking into how vaccinations affect Kidding weight, we wish to find patterns in weight to further optimize the production of goats. With this, we can get goats to more farmers and also increase the scope of goats to reach more consumers.

We plan to incorporate the data in a relational database schema. However, our model will not need any relationships between entities, as we will only need to analyze data within either a population or subsets of the population. Therefore, we will rely on three entities that will follow a superclass and subclass model. Each “Goat” will be classified as a superclass entity containing the following attributes: “overall_adg”, “DOB”, “Last_weight”, vaccination status, and “goatID”. These attributes will apply to all the subclasses. Goats will contain a unique, key attribute called “goatID”, found within all provided databases, allowing us to classify and differentiate all goats within the ranch. “Last_weight”, found within the “Animal” database, is the most essential data we must gather for each goat entity. We will be using a python program that will intake the recorded weights, sort, and calculate lowest average, median average, high average,

and overall average. “Overall_adg”(average daily gain), extracted from the “Animal” database, can be used to project weight of young goats for future selling, giving the opportunity to eliminate goats who will not meet the standards for profitable goats, saving resources and space. For max efficiency, another program will be used to create a list of “projected weights” for young dams, eliminating goats who do not fall within the standard range. “DOB”, found within the “Animal” database, will determine the age of the goat. The database lists dates in terms of nanoseconds, therefore we will need to use a program that will convert this number into a readable date - the age will be calculated manually from there. Lastly, “vaccination status” will be a created attribute that will vary for each goat entity as they may either contain “NULL” or are vaccinated with 1 or more of the 8 following vaccines: Lepto/vibrio, Chlymidia/lepto/vibr, 5 in 1 Vacc, Sore mth, Chlamydia, Ivermectin, DL, PMHQ INTRANASAL, CD AND T VACCINE. Based on the goats vaccination status, we can determine if a goat being over or underweight is a cause of being vaccinated - our research topic. “Female” and “Kid” are further subclasses of the “Goat” superclass. “Female” will not only contain the attributes of the “Goat” superclass, but it will further contain the local attributes “Number of Kids” and “pregnancy status”. Females are able to give birth to singles, twins, and triplets, as shown within the “alpha_value” column of the “Animal session traits” database. To classify a goat if they are first time mothers or older moms, we will be able to look within “pregnancy status” which records “1st time Pregnancy US” or “2nd time Pregnancy US”. The second specialization of the superclass is “Kid”. This will contain a single attribute, “Birth weight” which will be used for comparisons. We assume that

goats within the “Kid” subclass can be later implemented to the “Female” subclass due age.

In summary, the data will primarily focus on weight in accordance with vaccinations. By noting the vaccinations each goat has, we can see how the Dams produce kiddings and how birth weights can differ. By separating the goats and mothers (Female) class, we can isolate the variables and we can look into how many pregnancies a dam has, in addition, we can determine the different kidings weights produced by the same mother. This provides valuable insight into comparing weights and seeing how vaccines can affect a mother’s offspring. Things such as DOB will be used in identifying when a goat is born so we can compare for Kid weight. The overall average daily gain (ADG) of goats differ across different vaccination statuses to look for variance. With this we can determine a pattern between vaccines and if it affects kid weight and if a goat being over or underweight is a result of vaccination.

The data could help us identify sustainability problems and opportunities to propose positive change because it helps us to determine how heavily of an impact genetics have on birth weight, as well as overall weight of a goat. Understanding the implications of certain genetic patterns can help breeders select goats that have healthier birth weights, which improves the overall health of them. Too low or too high birth weights can cause a variety of issues in goats, but can also indicate health issues of the dam during pregnancy. By analyzing this data, we can identify underlying health issues that may impact the quality of life for newborn goats. This can also present opportunities for positive change because figuring out the cause of weight problems can allow us to work to improve reproductive success and increase the likelihood of

producing healthy offspring. According to goat researcher, Kendra R, “Extra fat around organs stresses them, making them work harder than necessary. Too much fat in the pelvic region can lead to sluggish labors or dystocia (birthing issues) and give the breeder greatly reduced “room to work” inside a doe that needs kids rearranged. An overweight goat will experience more stress on its limbs and joints and be more prone to lameness.” By optimizing weights within goats, this can lead to a decrease in mortality rates and increased quality of living for the goats.

Use Cases

Use Case:	Data visualization - Be able to display graphs of weight, age, and vaccination status. Users can have trends over time visualized and compare different groups of goats based on characteristics
Actors:	Goat ranch owner
Flow of events:	1. Ranch owner accesses the database though device. 2. Upon accessing the database, the user is presented with options to select the variables they wish to visualize, such as goat vaccination status, weight, age, projected weights of younger goats, etc. 3. The user selects any additional parameters, such as time range or specific goats to compare. 4. The system using the given database produces a graph presenting the specified data.
Extension:	1. The database fails to load. 2. The ranch owner lost/does not have access to the database. 3. The program fails and crashes/does not produce a graph.

Use Case:	Customers look to purchase a Dam based on female weight and vaccination status.

Actors:	Customer
Success Scenario:	1. The customer accesses the database through the website. 2. The customer accesses the dam statistics pertaining to weight and kidding rates. 3. The customer makes a selection of what dam/s they want to buy. 4. The customer makes a purchase through the site and the purchased goat information is no longer available on the website.
Extensions:	1. The database fails to load. 2. The customer does not find a Dam they wish to purchase.

Citations

Shatswell, Kendra R. “Fat, Muscle, and Body Condition in Goats.” HeftyGoatHollerFarm, HeftyGoatHollerFarm, 23 Jan. 2022, www.heftygoathollerfarm.com/post/fat-muscle-and-body-condition-in-goats.

OECD-FAO Agricultural Outlook 2023-2032. https://www.fao.org/3/cc6361en/cc6361en.pdf