MLA Report - Value of LBS services

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Document Summary

Overview of findings and insights

Several independent studies were conducted in Australia to test the value of data generated by what they called on-animal sensors. For most, these were collar devices they deployed on subsegments of mixed herds, some sheep and some beef cattle. Bullets below are the main points worth extracting from the study.

- One of the most important factors is the type of animal used in the mathematical calculations of ROI, as a large number of the studies involved sheep, whose stock value is much lower than that of beef cattle. Sheep also chase a different kind of value, as they need to be shorn multiple times before being sent for slaughter. The details of each study broke the calculations by animal type in most cases.
- Land that is not being used for active grazing could have a number of issues with it, which is why it is important to identify. It could mean, for example, that phosphorus levels in the soil are too high because of over-fertilization with no means of absorption and dispersal.
- Ranchers always want to know when animals are spending large amounts of time near a water source (within 50m) to the point that they all wanted alerts for the anomaly.
- Water issues can be a number of different things, including salinity problems, which can be tough to detect in otherwise clean-looking water.
- Fertilizer: more efficient use of fertilizer could result in cost savings of 2.6%.
- There is a strong correlation between average daily distance traveled and average daily weight gain, which correlates with lower finishing costs.
- It would be possible, with larger data sets, to identify the $/lb difference of interventions that result in increased daily travel.
- Mustering efficiency is not just about saving time, it's about getting a clean sweep that would allow the rotated grazing area to regrow more quickly and evenly.
- Restlessness index (p33) identifies problem animals.
- Understand the capacity of the grazing area by analyzing the land usage data, then be able to convert that into $/acre measures that can predict whether or not a rancher can accommodate more animals with the land they have.
- Fly Agitation Index and insecticidal eartag treatments
    - Identify animals before infestation becomes bad
    - Only need to deploy treatment where intervention is necessary instead of treating the entire herd
    - Deploy treatments at the right time (too early means it might wear off before late season infestations occur)
- Cows in paddock feed differently (diurnal activity) than those on a range (high activity that slowly tapers off throughout the day).
- Cows move less when it's hot outside.
- ROI measure benefits are less than half with sentinel deployment vs. whole herd.

Significant pages and figures in the doc

Page	Content
33	Restlessness index
62	Movement vs. ambient temperature
72	Ranking/ordering of importance/value of each major ROI metric
79	Revenue gains summary table
107	Value summary similar to p72
144	Biosecurity risk quantifiable value

Strategic Focus

Metrics with real financial values

The studies provided three major calculable dollar-value metrics that can be leveraged to quantify the benefits of tracking.

The first and most prominent of the triad is the ability to convert other data that correlates with average daily weight gain. Average daily weight gain (ADWG) is one of the most important metrics for any rancher who finishes off the range, as it gives them the ability to estimate each animal's ideal time to be collected and sent for finishing. It also gives ranchers the ability to identify animals that will require more feedlot resources during finishing. The critical piece of information here is that anything that correlates with increased ADWG correlates with increased revenue and/or decreased finishing costs.

Land usage data makes it possible for ranchers to translate tracking information into two different dollar-value metrics of ROI. For ranchers operating on their own land with the need to fertilize and manage pasture regrowth efficiently, tracking under grazed land can inform farmers of areas where the soil might have too much phosphorus, poisonous vegetation, or other issues that would directly affect the costs of fertilizer (only fertilize the places that need it) and regrowth (rotate grazing patterns more efficiently).

Finally, monitoring land usage at the aggregate level over a long period of time, ranchers can begin to see patterns about land usage that indicates the land's capacity, potentially leading to insights about maximizing the $/acre of their land by accommodating more animals. In some cases, ranchers may even learn that they are over capacity, which is causing increased needs for fertilization, regrowth, and grazing rotations.

Water related behaviors

Cited throughout the studies as the largest potential opportunity for beef cattle, understanding water usage by livestock is an area of critical importance for ranchers. Availability and consumption of clean water affected a number of different things, from average daily weight gain to average distance traveled per day (which also correlates with average daily gain).

Focus of the research was placed on time spent near water sources, time spent near broken water sources, and time spent near clean and working water sources. Proximity of 50m was used to determine whether or not an animal was “near” a water source, and there were strong indicators that movement (location alone) could be used to train algorithms to identify contaminated or broken water sources and alert the rancher.

This is significant because we previously identified water related opportunities as simply helping prevent animal-related fouling of the water sources. Identification of bad water sources now has a financial value, as it correlates with reduced average daily distance traveled, which correlates with average daily weight gain.

Land utilization

Land utilization data seemed to be some of the most important data across all of the people who participated in the studies, and it likely has to do with the way ranchers operate in Australia. With many of them dependent upon private land that they have to maintain, things like grazing rotation and fertilizer costs are significant sources of investment and cost consideration. It’s unclear how the values of land utilization will translate to markets where animals graze openly on public lands.

The expectations for this type of data is that it is considered over longer periods of time instead of real time like most tracking applications. Seeing a week-long or average daily heat map of land usage in grid format is the standard expectation for nearly all participants, and the value of the insights reflects this desire to consume it in this format and frequency. This lines up well with the fact that GSatRancher units on an entire herd would deliver data exactly how they would want to use it for this application.

Mustering/Roundup/Gathering Efficiency

Not much new to contribute to this understanding, with the exception of having a quantified benefit to it (~2.7% revenue gain from ADWG and ~3.8% cost savings), and also having a previously under-discussed benefit of a correlation between “clean” mustering practices and better pasture regrowth rates. This again relies on the fact that ranchers in Australia are largely responsible for maintaining their own land and keeping their paddocks sustainable.

Biosecurity

Biosecurity is part of a group of data applications lumped together as catastrophic or unusual events (CUEs). The majority of participants recognized the value of being able to control disease outbreaks, particularly those

that are most preventable like buffalo fly infestation. The issue is that the likelihood of these events brought the total impact to less than 1% lift in terms of ROI when calculated out.

Additional sensor behaviors

Many participants cited a number of things they felt could be detected and alerted based on accelerometer data associated with rapid ear movement, head cocking, and other anomalous patterns of movement. These things include oestrus, buffalo fly infestation, agitation index, “bull or ram activity” and calving.

Sound detection was also identified as a source of data that could potentially be leveraged for greater insight. Given the unending number of things a device could track with sound recognition AI, it seems like a great opportunity to spend a lot of time generating things we don’t have any validation that people would pay for.

Herd vs. Sentinel deployment

Perhaps one of the largest benefits of this series of studies is that they tested both whole herd and sentinel deployment methods. For sentinel methods, in most cases, they deployed at a rate of 1 in 10 animals. The results are great for a number of reasons, all of which benefit the positioning of the GSatRancher.

First, results overwhelmingly showed a dropoff of more than 50% of total ROI by deploying sentinel methods only, making it clear that the best choice would be a whole herd deployment. They have plans to scale sentinel numbers in future studies to see if there is a penetration rate that does result in good ROI.

Finally, of the major benefits identified as being the drivers of tracking ROI, the two most important require whole herd deployment, and the next two have ideal efficacy with whole herd. It’s not until you get out of the top 5 that a sentinel deployment is effective enough to maximize ROI from one of the return metrics for beef cattle.

Sentinel deployment ROI was actually quite strong for the segments of the study involving sheep, but even then, the best ROI metric for that category was matching lambs with ewes to identify which portions of the herd they could cull for lack of productivity, which requires a whole herd deployment method.