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INTRUCTION

The US Army has revolutionized geographical mapping and has evolved from a military survey tool to providing a broad array of public applications. **As early as 1995, the first animals were tagged with global positioning system (GPS) telemetry** (*Zimmermann, 2013*).

GPS telemetry is the act of performing measurements of an animal at a distance, acquiring GPS information of the animal at a remote location and then transmitting that information to a central or host location.

These recorded measurements are then used for monitoring, assessing, decision making, understanding and managing the animal.

MONITORING CATTLE USING GLOBAL POSITIONING SYSTEMS (GPS) TELEMETRY

GPS telemetry has been applied all over the world for many years to monitor wildlife, and it **is currently rising in understanding livestock mobility, foraging behavior and other behavioral activities in different settings**, providing valuable real-time operational and managerial data.

GPS telemetry technology gathers information that allows the farmer to **monitor and map the details of animal movement**, animal

positions provide the elemental unit of movement path and where individuals interact with the ecosystems around them. Acquiring such crucial information can help farmers and scientists in their search for a mechanistic understanding of key concepts of animal ecology, rangeland resource use, home range, and dispersal and population dynamics.

Livestock are good indicators of forage availability, quantity and quality; using the GPS telemetry can assist in rangeland management, improving efficiency of utilization and enhancing the productive performances of livestock in general.

It is probable that in time, intense sampling of movements coupled with detailed information on habitat features at a variety of scales will allow **farmers to represent an animal's cognitive map of its environment, and the intimate relationship between behavior and fitness.** An extended use of these data over long periods of time and over large spatial scales can provide robust inferences for complex, multifactorial phenomena, such as meta-analyses of the effects of climate change on animal behavior and distribution.

Therefore this application of GPS telemetry tracking results in much improved accuracy and reliability, **as opposed to direct observation method that has proven to require considerable labour,** the presence of an observer can modify animal behavior at any stage, and being only applicable during daylight period.

HOW GPS TELEMETRY WORKS

There are several types of telemetry instruments, built according to the farmer's preference or aim of use.

A GPS collar for instance is a type of telemetry that records position (co-ordinates) of the animal at a fixed interval; **the information is stored on the collar (built in storage) and later downloaded with a wireless transceiver.**

The downloaded data will be then analyzed, which provides diverse information about the animal and the surrounding rangeland. **The collars also contains a sensor that measures the ambient temperature around the animal**, which gives valuable information on what the animal is experiencing and how it response to ambient temperature.



Figure 1. *The Namib Desert cow movement between the gravel plains, dunes and the Kuiseb River (blue and red circles) in two months.*

CONCLUSION

Livestock telemetry acts as a farm management tool, as it is an applicable tool that promotes precision agriculture, assisting farmers in improving livestock production and rangeland management.

The Several types of telemetry tools such as GPS collars can be used on farms to understand animal behavior and possibly the rangeland at large. This technology is less costly (being less labour intensive) and is precise, hence it is the future.

REFERENCE

Rutter, S., Beresford, N., & Roberts, G. (1997). Use of GPS to identify the grazing areas of hill sheep. *Computers and Electronics in Agriculture*. 17:177-188.

Zimmermann, B. (2013). How does animal monitoring with GPS tags contribute to ecology and conservation?. *Special issue on applied ecology*. <http://www.utmark.org>