The Rural Development Administration (RDA) is a national agency responsible for managing rural development. The RDA was established to develop agricultural industry which is the country's funda-mental industry and to promote farmers' welfare by implementing test research projects, agricultu-ral extension services and training as well as edu-cation programs for agriculture-related manpower. RDA is responsible for managing R&D of technology, distribution and guidance of researched and developed agricultu-ral science and technology, quality management of fertilizer, pesticide and agricultural machinery, on developing local agricul-ture and life improvement and professional farmer fostering.

For more info please go to: http://www.rda.go.kr/

Challenges

✓ The breeder has to personally observe and identify the mating season of cattle.

✓ If breeders mistime the mating season, they have to wait for the next season, which is 21 days later.

Solution

Developing the mating season recognition system based on the cattle's behavior - identifying the mating season of Korean native cattle (Hanwoo) and dairy cattle.

TeamViewer helps to identify the mating season of cattle through remote control - leading to an increase of pregnancy rate from 70% to 95% with artificial fertilization at the right time.

Smart Farm: Identifying Cattle's Mating Season With Smartphone By Using TeamViewer

Increasing the agricultural household income by 20% with the RDA 'cattle behavioral mating recognition system'

The Rural Development Administration(RDA) is an agency under the Ministry of Agriculture, Food and Rural Affairs that is responsible for experimental research, enlightenment and technology diffusion re-garding agrarian improvement. Since its foundation in 1962 in ac-cordance with the Agricultural Community Development Promotion Act, RDA has been conducting R&D for agricultural science and tech-nology, distributing research outcome to farms, performing quality management of farm materials such as fertilizer, pesticide and ag-ricultural machinery, fostering professional farmers and supervising agricultural life improvement.

It addressed the Korean citizens' food issues with the food self-suficiency through the Green Revolution in the 1970s and the White Revolution in the 1980s. It has also accomplished a great deal for developing the agricultural industry through higher value-added life industry.

Lately, the RDA has been promoting the development and extension

of smart farm technologies as well as the implementation of a smart system that leverages information communication technology in the livestock sector. The agricultural farms are becoming smarter by utilizing big data and remote control software.

All cattles's activity increases as it enters the breeding season. Farms that raise cattle are recommended to use artificial insemination during this time to conceive a cal. It is not an easy task to identify the breeding season as the breeder needs to constantly observe the cattle's movement. Moreover, if **breeders** miss the right moment, **they have** to wait for 21 days and more for the next mating season, which generates the loss of time and cost.

Distribution of a cattle behavioral mating season recognition system that utilizes TeamViewer

The Rural Development Administration introduced a „Cattle behavioral mating season recognition system" to livestock farms to reduce the burden of the farms and to detect the cattle's mating season precisely. The system informs breeders about the starting period of the cows' mating season and the right timing or artificial insemination that supports farms in effectively producing calves. A necklace detector on the breeding cows collects quantified data of their activity that is delivered to the computer via RF frequency. Then, the breeder observes the estrous o the cow to carry out a proper artificial insemination within 13 to 15 hours since the beginning o the target cow's estrous behavior. The system measures the

body heat of the cattle as the activity increases during the mating period.

A remote control function was required to create a smarter 'cattle behavioral mating season recognition system.' However, it took much cost and time to develop the relevant application by itself. In this regards, RDA searched for a remote control software that could support the system and chose TeamViewer. TeamViewer allows breeders to check the starting period of their cows' mating behavior even when they are away from their farms by connecting to a computer.

„Since it is easy to use Team-Viewer and it offers high applicability, it is the remote-controlled software that is expected to be greatly utilized in stock farms in the future." - *Hyunju Jin, Agricultural Researcher (PhD) of the Technical Assistance Di-vision at the National Institute of Animal Science*

Hyunju Jin, Agricultural Researcher (PhD) of the Technical Assistance Division at the National Institute of

Animal Science, said, „TeamViewer has been evaluated as a remote control software that **is** expected to create the greatest effect when it becomes implemented in stock farms due to its easy-to-use feature-set and high reliability. In fact, the income of agricultural households has in-creased as TeamViewer was introduced into the system."

Seok-Hwan Baek, who owns about 80 cattle in Daejeon, identifies the mating season at a glance with the intro-duction of this system. Baek said, „The price of one calf is KRW 3 million. If I miss the mating season I suffer the loss of KRW 3 million in 21 days. Since the utilization of the new cattle behavioral mating season recognition system which uses TeamViewer, the pregnancy rate has increased from 70% to 95% and the income has increa-sed by 20%."
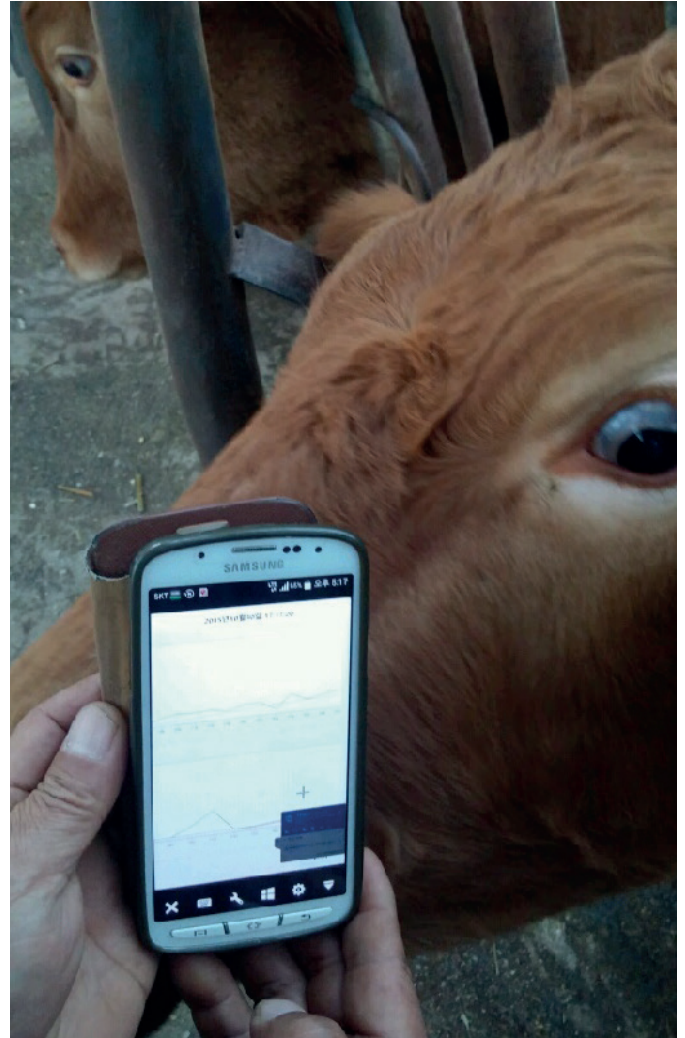
According to the result of test operation on 160 farms which implemented this system for the past 2 years, the mating recurrence cycle of Hanwoo cattle has decreased by an average of 16% from 68.1 days to 56.8 days, while the pregnancy rate has increased from 75.7% to 87.3%. Hyunju Jin said, „If the artificial insemination is comple-ted within 13 to 15 hours at the point when the cattle's activity increases, the pregnancy rate can increase as high as 87%."

The RDA has patented the system in February 2015 and transferred the relevant technology to the industry. By now, 158 farms that raises cow have implemented this system.

„We will revitalize ‚smart farm' integrated ICT such as TeamViewer"

The RDA is putting efforts on establishing a system that can manage the data on stock mating season more systematically by further developing the cattle behavio-ral mating system recognition system. At the moment, the primary function of cattle behavioral mating season recognition system is to find out the cows' mating beha-vior. We plan to to develop a system that could manage the target calf's temperature and hygiene. Hyun-Joo Jin said, „We will focus on technological diffusion to revi-talize smart farm by integrating with information and

technology technologies for the livestock sector."