

## RESULT 2: OPEN PLATFORM FOR SHARING KNOWLEDGE

### WP 1: Learning Environment for SMEs

## CASE STUDIES DEVELOPMENT

### APPLICATION OF SLURRY MANAGEMENT IN A CATTLE FARM

#### Part 1: General information for the enterprise

1. Name: Bonafarm
2. Location: Csípőtelek, Hungary
3. Subject of activity: dairy cattle farm
4. Legal status: private limited company
5. Management
  - a. Gender: **Male** / Female / Other
  - b. Age: up to 35 / 36-45 / **46-55** / 56-65 / over 65
  - c. Education: primary / secondary / **higher**
6. Farm size
  - a. 3000 cows

#### Part 2: Smart technologies used on the farm

*What smart technologies does the farm have? When and where are they applied? Is the accumulated data used and how?*

At Bonafarm's cattle farm in Csípőtelek, the OkosFarm slurry management system measures the current consumption and voltage of the mixers, pumps and separator equipment. In the event of a fault, an alarm is sent immediately via a graphical interface or even by e-mail. The Smart Slurry Management System also measures the level in the manure basins and indicates when the level is critical. The process shows which machines are running and which are at a standstill or have failed. An IT interface tailored to the company and its employees has also been developed.



The system was developed by a Hungarian company called OkosFarm, which has been working on the integration of industrial process monitoring and control solutions in different areas of animal farming. Together with BAUER Ltd., OkosFarm designed a monitoring system that can perform the tasks of continuous monitoring, alarm management and data collection in manure management at industrial level. Éva Tóth, Managing Director of BAUER Ltd. pointed out that no one else in this field has ever had an innovative infocommunication solution capable of providing comprehensive information on the entire manure management process at local operational and professional level.



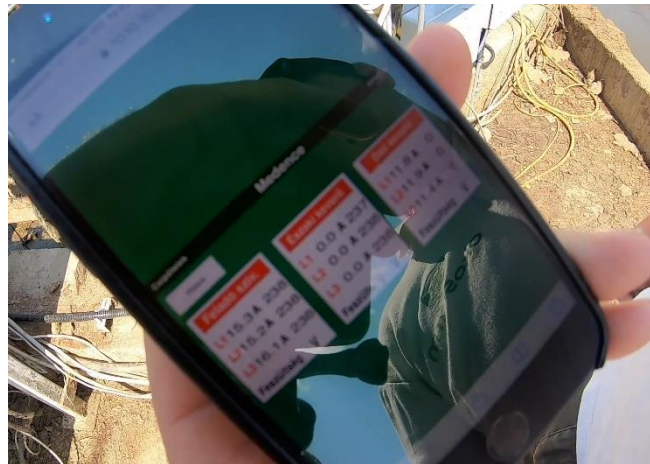
For farms like Bonafarm, with a large number of animals, the huge amount of slurry produced is a serious problem, especially on farms with too many animals per unit area. At the same time, the most valuable natural source of nutrients for such farms is manure. Strict legal requirements make the situation even more difficult, as slurry has to be managed in accordance with these strict standards. Traditional slurry management systems are very time and labour intensive and the investment costs are huge. Slurry treatment with a separator is particularly ideal for farms with a large number of animals and a small area of application, as it can result in a reduction of up to 30% in storage capacity.



Separation is the first step in slurry management. It is the starting point for further effective manure processing. After separation into solid and liquid media, there are many purposeful possibilities for further processing. Today, valuable bedding material or compost is produced from the separated solid matter. The liquid manure, in turn, ensures safe growth on the cropland in every vegetation phase. This replaces chemical fertiliser and saves money, protects the environment and promotes animal health. For farms with high animal concentrations, the enormous amount of slurry produced is a major problem, especially for farms with too many animals per unit area. Legal requirements aggravate the situation. Therefore, the slurry must be treated accordingly. Conventional systems for treating slurry are very time-consuming and labour-intensive, and the investment costs are enormous.



At Bonafarm's plant in Csípótelek, the entire manure handling process and the group of machines that carry it out are monitored. The system detects actual failures that have occurred and, on the other hand, it can also predict expected failures by incorporating indicator parameters. The monitoring system also measures the uptime of each machine and is able to transmit the data to the machine group operator and to the supplier. Professionals can monitor relevant information on electronic devices - tablets, mobile phones - 24 hours a day. In terms of service and maintenance, the ability to use the measured data to perform instant remote diagnostics is an invaluable benefit, allowing workers to arrive prepared to fix a fault and plan maintenance. In addition to the user interface, they can also see the operating hours, engine temperatures, and fault signals from oil leaks.



For installation, the Bonafarm cattle farm had to provide only a single fixed internet connection endpoint, allowing an unlimited number of workers to monitor the process from anywhere at any one time, via their laptops, PC monitors or Android and iOS apps. The deployed system has already saved the site a significant amount of money - nearly half a million forints - within a few days of the trial run, as the site manager detected a blockage and dealt with the situation within minutes. It was a problem that, if noticed hours later, would have caused serious damage to the engines and other units in the plant. In terms of system investment, a full return on investment within 2-3 months is expected by avoiding prevented losses and unnecessary on-site presence.

### Part 3: Owners' satisfaction with the use of smart technologies

#### 1. Utility assessment

*Is the farm manager satisfied with the smart technologies used? What benefits and advantages have they brought him?*

Kornél Takáts, engineering manager of the Bonafarm cattle farm at Csípótelek is extremely satisfied with the smart technologies they have implemented. It brought them numerous benefits and advantages that have significantly improved operations. Firstly, the remote monitoring and control system has enhanced their ability to monitor and manage the slurry management process effectively. They now have real-time visibility into the performance of machines, such as mixers, pumps, and separators. This enables them to identify and address any faults or potential failures promptly, minimizing downtime and reducing the risk of significant damage or process disruptions. The preventive aspect of remote monitoring has proven invaluable in preventing major issues. Secondly, the integration of smart technologies has greatly increased the efficiency and productivity of the workforce. With remote diagnostics and access to real-time data, technicians can arrive at the site fully prepared to address specific issues, saving time and optimizing maintenance activities. The system also allows them to measure employee efficiency, ensuring tasks are completed on time and providing valuable insights for performance improvements.

*“The Csípótelek cattle farm is a 3000 head cow herd, where we have solved the hygiene of the barn with a water flushing system, a major component of which is our manure management and some of the equipment for manure management. Like the separator itself, the storage pump, we have big pumps. The monitoring and supervision of these has not been done so far. The smartfarm system helps us a lot to predict what the faults might*

*be, to optimize the system, to make sure that the performance of the separator is not exceeded by flushing, to improve the performance of the separator, to prevent trouble, to prevent it from going bad. I constantly monitor the system, which is how I noticed, for example, the simultaneous failure of our mixers in the 500m<sup>3</sup> sump. In the B2 bin, after the installation of the monitoring system, the replacement of our engine security system was also carried out with the help of the Okosfarm technology, and we managed to reduce the volume of reclaimed water in the manure manipulation area so that our sand treatment is now much better.” – said Mr. Takáts.*

Okosfarm technology also provides comprehensive data and historical records, which empowers the management team to make informed decisions and implement data-driven optimizations. They can analyze trends, identify areas for improvement. This level of visibility and control has resulted in better resource management, reduced costs, and improved overall profitability. From an environmental perspective, the smart separation technology and other smart solutions have made a significant positive impact. By separating slurry into solid and liquid phases, they can minimize the release of harmful gases and pollutants. This aligns with their commitment to sustainability and environmental stewardship in livestock farming. Additionally, the integration of digitalization technology opens up possibilities for further advancements, such as biogas or manure digesters, which can contribute to climate neutrality objectives. In summary, the smart technologies implemented at Bonafarm have provided the engineering team with enhanced monitoring and control capabilities, improved operational efficiency, optimized resource management, and contributed to sustainability goals.

*"The benefits of the system are first and foremost for site workers and company managers, as they can effectively control their processes, avoiding potential downtime and preventing costly repairs. The user interfaces can be personalized to provide different access rights and graphical interfaces to different information for the on-site animal keeper, the site manager and the company manager. The former two are more interested in operational, live data and alarms, while the management is more interested in historical data and its financial implications." - explained Zsolt Papp, OkosFarm's operational manager, who was responsible for the measurement data collection and IT side of the project at Bonafarm.*

## 2. Observed difficulties and problems

*What difficulties have they encountered or are encountering in using the new technologies? How did they learn to work with them? Do they have maintenance and consumables issues?*

Mr. Takáts highlighted, that the extent and fragmentation of agricultural settlements is greater than in industry. The basic IT infrastructure networks to ensure the flow of information at the pace of production are not in place or are limited. The sector has a low level of "digital maturity", meaning that there is no ingrained culture of IT technology in agriculture. In his experience, many managers are faced with the challenge of wanting to introduce new IT-based technology, but there is a high level of resistance from the workforce within the company, with little willingness/ability to adopt and use it. As a result, implementation is often discouraged.

For Bonafarm, one of the main challenges was ensuring a smooth transition from traditional systems to the smart technologies. It required a period of adaptation for the team to learn how to effectively operate and utilize the new systems to their full potential. To overcome this challenge, engineers at Bonafarm collaborated closely with the technology providers, OkosFarm and BAUER, who offered comprehensive training and support. Their expertise and guidance were instrumental in helping the local team to understand the functionalities, capabilities, and proper utilization of the smart technologies.

The ability to perform remote diagnostics using the measured data has been invaluable. It allows them to detect faults or potential issues in advance, enabling us to plan maintenance activities more efficiently. By addressing problems proactively, they have been able to prevent major breakdowns, minimize downtime, and optimize the lifespan of the equipment.

While there were initial challenges during the implementation phase, the team has adapted well to working with the new technologies.

### 3. Potential risks

*Are they worried about issues such as post-warranty service, integration with next-generation technology, and being tied to a specific supplier or brand?*

While Mr. Takáts has had a positive experience with the current smart technologies, he does have some concerns regarding post-warranty service and integration with future advancements. It's crucial for the whole team at Bonafarm to have a strong partnership with the technology providers to ensure ongoing support and assistance

Integration with next-generation technology is also a consideration for them. As technology evolves rapidly, Mr. Takáts wants to ensure that the smart technologies they have implemented can seamlessly integrate with future advancements. This is important to maximize the longevity and adaptability of the systems. He has been in discussions with technology partners about their plans for future developments and their commitment to staying at the forefront of innovation.

Regarding being tied to a specific supplier or brand, it's a valid concern as Mr. Takáts confirms. He wants to maintain flexibility and avoid being locked into a single supplier or brand. That's why he prioritizes partnerships that offer open systems and interoperability. By working with technology providers who follow industry standards and provide flexible solutions, he tries to avoid vendor lock-in and have the freedom to explore different options or switch suppliers if necessary.

## Part 4: Financing the investment in smart technologies

*How is the purchase of the new technologies financially secured - own funds, bank loan, financing under a particular program? Do they think that the prices of these technologies are beyond the means of most farmers? Do they feel that the decision to purchase their devices was astute and effective?*

At Bonafarm, they utilized a combination of their own funds and financing options provided by a national program.



*“It is true that the prices of advanced technologies can sometimes be perceived as high, and they may seem beyond the means of many farmers, especially smaller-scale operations. However, it's important to consider the long-term benefits and cost savings that these technologies can bring. In our experience, the initial investment in the smart technologies has been offset by the increased efficiency, improved processes, and cost reductions we have achieved.” – said Mr. Takáts.*

Looking back, he is confident that the decision to invest in these devices was astute and effective. The benefits they have experienced, such as improved monitoring capabilities, timely fault detection, and optimized operations, have had a positive impact on our overall productivity and profitability. The savings in maintenance costs, reduced downtime, and prevention of major damages have further reinforced our belief in the effectiveness of these technologies.

*“Additionally, we have seen how these technologies contribute to meeting environmental standards, promoting sustainability, and aligning with the evolving demands of the agricultural sector. The ability to comply with regulations while optimizing our operations has been a significant advantage.” – said Mr. Takáts.*

## **Part 5: Future intentions towards smart technologies**

*Do they intend to continue using new technologies? Do they plan to purchase new types, and if so, what kinds? What are their intentions with the devices they own - do they plan to replace them with more recent generations as they become available?*

At Bonafarm, the team is committed to embracing new technologies and continuing to innovate in farm operations. The positive impact they have witnessed with the current technologies motivates them to explore further advancements that can enhance our efficiency, sustainability, and overall performance. As for the specific types of technologies they plan to purchase, they have a keen interest in exploring developments in areas such as data analytics, automation, and precision farming. These technologies have the potential to revolutionize various aspects of their operations, including animal monitoring, resource management, and crop production.

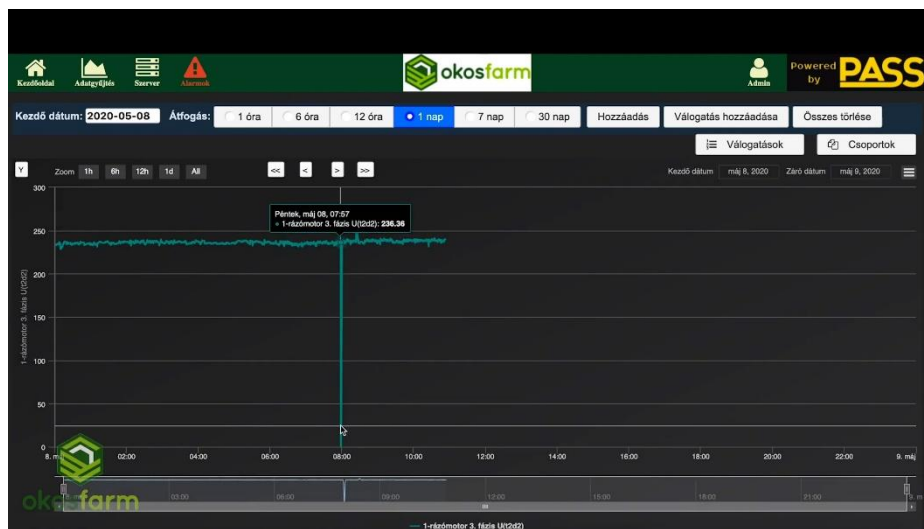
## **Part 6: Some photos**



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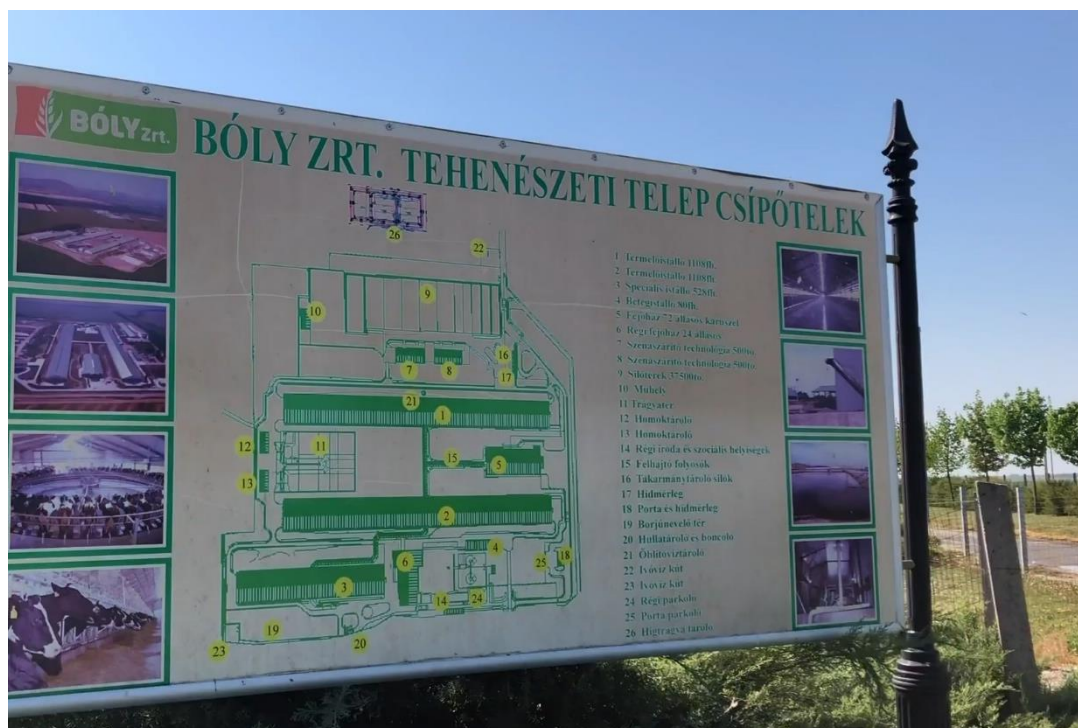


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