

Ongoing improvement on automatic milking, forage harvesting and sustainable energy production

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1. Introduction:

Due to increasing cost of labor and energy , the demand for sustainable production and sustainable use of resources and the demand for increasing welfare of humans and animals the agriculture industry has to change and improve its machinery and has to find new solutions.

2. The changing agriculture world

2.1 More labor efficiency requested by the farmers / investors.

Reduction of labor-cost (labor in the Western World makes 30% [1] of the cost-price of a liter of milk for a producer this part is increasing worldwide, replacement of unreliable labor-force (especially in USA, East Europe, China).

2.2 More friendly work / human welfare demanded by laws and people

Regulations coming for instance from the EU for animal welfare [4] and regulations for EU labor conditions in dairy farms [5] force a change of machinery and surroundings.

2.3 More animal (in my case cows) welfare demanded by public opinion

Groups like “eyes on animals” [10] watch and check (unasked) transport, keeping, slaughter etc. from animals and reach and steer by social media the worldwide public opinion. We are working in a glass house. Therefore we need to do things in a proper way not to spoil the already low image of farming.

2.4 Less use desired for energy for costs and environment

The selling price of diesel (for example in Belgium) has gone up over the last 8 years with 25% [6]. E [7] and UN [8] make agreements about the use of alternative energy as part of the total used energy in each country.

2.5 Less wearing of machines demanded

To save costs and use of materials the machinery should be more reliable. Less risks of breakdowns and equal wearing of the machine just by time and not by peak-loads.

2.6 Sustainable production of energy

Development of new solutions to generate energy via a sustainable way with natural sources like wind, solar or manure solutions at the dairy farms (without wasting good crops! Here is a the coming years a lot to win.)

3: Examples of improvements

3.1 Labor

A 1.200 dairy cow farm in the East part of Germany reduced its labor-force with more than 50% from 29 to 14 employees and kept the same output of the cows by using automation in milking the cows and cleaning of the floors.

3.2 Reduced use of Diesel by other constructions / machinery.

With an electric powered feeding automated system [fig 2] (1 kWh 0,14 Euro / 8000 kWh) a farm can save diesel (1.4 Euro / 5.000 liters per year) and labor and reach even a higher yield of the cows by more efficient feeding and less left overs at the feed-fence [2].

3.3 Machine improvements (Continuous Baler)

By changing the existing way of making round-bales from baling / binding / stopping / releasing / starting into a system of continuous baling [fig 2] less fuel is used for starting. Wearing of brakes, power take off and other mechanical parts is reduced what leads to a longer life time of the baler and the tractor and has a more pleasant way of working for the driver [3]

3.4 Sustainable energy production (wind and manure handling)

By using alternative energy sources like dedicated wind-turbines (up to 30 kW for a 120 cow farm) or new generation manure handling systems a farm can become self-sufficient in the needs for electricity.

4. What will be the direction of the industry?

4.1 Changing the mentality in your own company (other buildings, cars, use of energy at the floor)

The basis is that all involved people are aware of the new world. The staff of any institute / factory needs to be aware what is happening in the outside world. The use of energy in the office, in the factory or by the company cars should meet the requirements that the customers demand.

4.2 Creating new activities to make agriculture production more sustainable.

In a changing world with new demands and new challenges each factory has to change its portfolio of products, has to improve modernize existing products to stay in the business. [fig 2]

4.3 To improve welfare for humans and animals in agriculture production.

Development of more friendly tools to work with under good conditions (like sufficient light, acceptable working times, no heavy jobs etc.) Animals should have easy access to feed, should have sufficient place and should have comfortable bedding.

4.4 Improving existing dairy and forage products

The industry has to develop and improve new machinery that meets all the demands listed above. Of course buy in of additional technology is a possibility as well.

5. an example of a mission and vision;

5.1 Vision:

A sustainable, profitable and enjoyable future in farming [9]

5.2 Mission:

We inspire people to create innovative solutions that help our customers excel in sustainable milk production, forage harvesting and energy sourcing.[9]

References

- [1] Dutch Dairy Board brochure
- [2] Rosa Hoeve company presentation / Fons Kersten
- [3] Lely forage product management / J. Ham
- [4] 2006-2010 COM(2006) 13 – Publicatieblad C 49 van 28.2.2006
- [5] RIVM Briefrapport 609300006
- [6] BE-stat 2014
- [7] Hernieuwbare energie EU-richtlijn 2020
- [8] UN Agenda 21
- [9] Lely website / Lely IMC
- [10] <http://www.eyesonanimals.com/nl/>

Figure 1 - Robot feeding system



Figure 2 - Lely CB Round-baler



Figure 3 - The dairy circle

