



## ***Co-ordination, support and promotion of needs-driven research & development in the South African dairy industry.***

**(PRJ-0242-2019)**

**Heinz Meissner**

**Quarter 1 2019** (January 2019 till March 2019)

### **Project goals**

**Goal 1 - To promote R & D, limit research fragmentation and initiate cooperation between R&D capacities towards achieving the strategic direction of the industry.**

#### ***Achievements***

As mentioned before, to align with our and the IDF's general theme of 'Sustainability' and to support the 'People, Planet and Profitability' concept, an R & D programme was submitted early in 2018 to the Global Climate Fund (GCF) and presented to the SANBI, which is the SA Administrative Agency for the GCF. The Programme: CLIMATE AND ECO-RESILIENCE OF DAIRY PRODUCTION, would have concentrated on combating climate change, but also includes a broad perspective on the 'sustainability' theme. A number of institutions would have participated, in support of the goal to stimulate cooperation between R & D capacities. Unfortunately, we in March have received notice that our application was not successful. On the positive side, some of the institutions which would have been involved have initiated with work, albeit with limited funds, e.g. US on Eco-efficiency of Pastures. It is important that we assist and continue to seek for funding organizations to supplement our limited levy funds.

With reference to our Genetic and Performance Improvement R & D programme, we await the outcome of the proposal submitted to the Research and Technology Fund (RTF) of DAFF, which is administered by the NRF. The title of the proposal is: A GENOMIC APPROACH FOR IMPROVEMENT OF WELFARE TRAITS IN DAIRY CATTLE. Prof Este van Marle-Köster of the University of Pretoria (UP-main campus) will take responsibility, also for the administration and budget, and the author will be co-responsible. The intended project will focus on functional traits not well recorded to date. They relate to mastitis (udder health), claw health and lameness, and feed efficiency and will be studied using a genomic approach to provide insight into genetic mechanisms, with the end goal of providing practical solutions for genetic selection and improvement of cow welfare. A number of institutions will be involved, including UP-main campus, UP-Onderstepoort, The ARC-API, Stellenbosch University and the University of Fort Hare. Also, with reference to the Genetic and Performance Improvement R & D programme, Phase 1 of the Dairy Genomics Programme (DGP) was completed at the end of March 2019. The DGP was funded by the Technology Innovation Agency (TIA) in a joint (co-funding) arrangement with the industry, the TIA's contribution being R9 707 500 over three years. The author on 20 February 2019 participated in a workshop to establish priorities for the industry, as the TIA is keen to commence with Phase 2 in 2019. It is expected that Phase 2 will go beyond genomics as the focus.

With reference to our Bio-control programme, the UKZN together with the author also submitted a proposal to the RTF fund of the DAFF. The title of the application is: BIOCONTROL OF TWO DISEASES AFFECTING DAIRY COWS. The diseases are liver fluke and mastitis. The project aims to develop biocontrol agents to control liver fluke and mastitic bacteria, and develop a new method to detect and quantify mastitis. Participants will be two departments in UKZN,

Plant Health Products (Pty) Ltd - industry partner re commercialization of biocontrol products, and Nir Spectro (Pty) Ltd - development of the Cloud-based NIRS calibrations and NIRS predictions of milk samples.

## ***No Non-achievements / underperformance has been reported***

### **Goal 2 - To guide the R&D program by means of effective structural arrangements, administration and fund sourcing.**

#### ***Achievements***

In terms of fund sourcing the budget of the RTF Programme, A GENOMIC APPROACH FOR IMPROVEMENT OF WELFARE TRAITS IN DAIRY CATTLE, mentioned under Goal 1 amounts to R570 000 for 2019 and the RTF Programme, BIOCONTROL OF TWO DISEASES AFFECTING DAIRY COWS, R424 000 for 2019. To access additional funds, we will follow up with the TIA to consider Phase 2 of the DGP project and hopefully will be successful.

The R & D Management Committee (MANCOM) usually meets officially about two weeks or more before the Dairy R & D Committee (DRDC) Meeting as it needs to inform and advise DRDC members. The author also meets regularly with the CEO of the MPO on administrative matters. The MANCOM met on 18 February and 8 March 2019 and the DRDC on 28 February 2019. The author also provided input at a DSA Standards workshop on 7 February 2019. Matters discussed at the DRDC Meeting include the 2018 annual reports of the research projects as summarized by the author, a visit of the CEO of Milk SA and the author to the UKZN to find solutions to the problems in financial management the project leader has at the University, a conference scheduled for 24/25 April by the Agri SA Commodity Chamber to discuss research and the associated funding and where the author will participate, and the economic implications of mastitis which do not receive sufficient attention by farmers. In addition, the proposed method which will facilitate judgement of progress against goal dates and spent funds against budget was finalised at the Meeting and the quarterly reports of 2019 should reflect that.

## ***No Non-achievements / underperformance has been reported***

### **Goal 3 - To accumulate and publish existing domestic and international scientific knowledge of applicable and practical value to enhance the industry**

#### ***Achievements***

THE RESEARCH COLUMN: The target of scientific articles sourced from the international literature to be entered on the website is two per month, that is six for the quarter. The target was met. Some of the articles were also published in The Dairy Mail under the regular research column of the author. The topics covered as reflected in the titles of the papers are:

- 1. Influence of milk protein concentrates with modified calcium content on enteral dairy beverage formulations: Storage stability.*
- 2. Differences between performance of F1 crossbreds and Holsteins at different production levels.*
- 3. Influence of cheese-making recipes on the composition and characteristics of Camembert-type cheese.*
- 4. Economic and epidemiological impact of different intervention strategies for clinical contagious mastitis.*
- 5. Genomic evaluation for calf wellness traits in Holstein cattle.*

6. *Assessment of the bovine tuberculosis elimination protocol in the United States.*

DAIRY R & D IN SA: The target of South African scientific articles sourced to be entered on the website is also two per month, i.e. six per quarter. The target was met. The following themes were covered:

- a) PROGRESS WITH LIVER FLUKE RESEARCH IN THE TSITSIKAMMA.
- b) FERTILITY TRENDS IN A SELECTION OF SA DAIRY HERDS.
- c) PERFORMANCE TREND MEASUREMENT POSSIBILITIES IN AUTOMATIC MANAGEMENT SYSTEMS.
- d) Non *Staphylococcus aureus* (coagulase negative staphylococci) (CNS) as potential bacterial threat to udder health in South African dairy cows..
- e) AGE GELATION IN LONG LIFE MILK.
- f) AN INVESTIGATION INTO TAKE-OFF TIME IN MILKING MACHINES.

***No Non-achievements / underperformance has been reported***

**Goal 4 - To advise and assist with national and international managerial, strategic and position publications on any matters which may support the strategic direction of the industry. Advice may also imply representing the industry on government and non-government bodies**

***Achievements***

- \* The AFMA technical Committee together with the Registrar of the Farm Feeds Act is adapting the Regulations to meet the modern requirements of farm animals. The author participates in the Dairy group.
- \* The author is a member of the WWF-SA/MPO Water Stewardship initiative and has participated in discussions at Woodlands Dairy/Trace & Save on soil, water and waste treatment. The Meeting was on 26/27 February in the Humansdorp area. The author provided a Draft of the IDF Water Footprint Guidelines to participants.
- \* Together with Prof James Blignaut of Asset Research, Dr Hendrik Smith of Grain SA and Dr Pieter Prinsloo, Chair of Agri SA's Commodity Chamber, the author is pursuing the possibility of allocating a monetary value to conservation farming and soil health. Through interaction with environmental attorneys, bank financial authorities and economists the possibility seems promising. Further developments include discussions with the Chairperson of the World Farmers Organization, Dr Theo De Jager, also to pursue funding for research to develop metrics to measure soil health and carbon sequestration. This initiative complements the theme of sustainability of the Dairy Industry and the principles embedded in 'Planet, People and Profitability'

***No Non-achievements / underperformance has been reported***

**Goal 5 - To support the dairy sector with R & D and advice on matters affecting sustainability. These include: Environmental – greenhouse gas reduction, carbon sequestration & storage, water and pasture fertilization efficiencies, waste and effluent reduction and treatment, and ecosystem and biodiversity protection; Animal welfare – the internationally acknowledged five freedoms (freedom from: a. thirst, hunger & malnutrition; b. discomfort; c. pain, injury & disease; d. to express normal behaviour, and e. fear & distress) are the point of departure.**

***Achievements***

One of the actions is a research, extension and training programme which the author seeks to obtain funding, the title being: **Climate change: Risk and sustainability management in dairy production.**

**Abstract:** As climate change threatens the sustainability of dairy production systems in South Africa, we need to support efforts and introduce methodologies and practices to limit GHG emissions, improve carbon sequestration and storage, improve water and pasture fertilization efficiencies, deal with waste and effluent treatment effectively, and protect ecosystems and biodiversity on farms.

Dairy systems are intensively managed and associated with high levels of methane emissions, high levels of chemical fertilizers, pesticides and irrigation, in addition to soil integrity and health loss through excessive ploughing. This puts strain on ecosystems. This also limits on farm carbon sequestration which is highly effective in mitigating greenhouse gas emissions - all impacting on food and water security and biodiversity. These should be addressed by:

- Eco-efficiency assessment, through life cycle analysis considering global warming potential, eutrophication, acidification, energy consumption and land use.

- To avoid over-irrigation, irrigation schedules should be calibrated for different pasture and crop/cover crop mixes under various topographic, soil and climatic conditions. Riparian buffering needs to be tested to limit eutrophication and improve water quality.

- Appropriate fertilizer rates should be established to maximize N use efficiency, avoid heavy metal contamination and support organic nutrient levels in CA practices.

- Mixed pasture and rotational crop/cover crop combinations should be established to offset the negative effects of single species cultivation on the factors mentioned above, for both commercial and smallholder situations.

- Risk, socio-economic benefits and adoption success by farmers should be determined.

Overarching, the outcomes of the programme should mitigate the effects of climate change on the efficacy and sustainability of dairy production systems through improving soil carbon sequestration, along with responsible water, agricultural land use and biodiversity management. A multidisciplinary team of experts need to be involved, i.e. agronomists, soil scientists, animal scientists, environmentalists/ecologists, social scientists and economists. PhD and MSc students based at various universities, researchers and technicians at experimental stations, and farmers and farm workers should benefit from the research, extension and training outcomes.

A second example is where the author commented on a document of the LEAP initiative of the FAO, the title being: "LEAP3 PROJECT PROPOSAL: ACTIVITIES AND DELIVERABLES". Two statements in the comments may be of significance for the reader:

"I do not think we should try to distinguish between countries with high and low environmental footprint. We have industrialized (high) and non industrialized (low) countries, but industrialized countries in terms of agricultural (and therefore livestock) environmental footprint may be low per unit product produced because of particular measures such as improved efficiency and production system employed. Overall though the agricultural (livestock) environmental footprint may still be higher because of total scale of activity and numbers compared to non industrialized countries. Also, production system is a function of investment and resources, which sometimes are not available in poorer countries. Another factor, which I have emphasized before, is that the environmental footprint must be calculated as the net between GHG emissions and carbon storage/sequestration. It is of little use if one increases efficiency by intensifying (lower GHG emissions) but one's carbon stocks and sequestration are low because of conventional tilling practices and high inorganic fertilizer use to produce the corn and soybeans which one uses in the rations of the animals. I can add further examples. This shows that it will be extremely difficult to effectively distinguish between countries with low and high environmental footprint. Some, as yet, haven't even done the calculations.

Agriculture (and therefore the livestock sector) has a huge obligation to assist in limiting CO<sub>2</sub> accumulation, by yes emissions reduction, but even more so by the carbon sink (sequestration) method. To stimulate participation by global farmers, incentive schemes, also to provide suitable carbon offset avenues for companies with high footprints, need to be developed in a standardized way (meaning through guidelines that are suitable to everyone). I therefore support the intended LEAP3 intention of work towards Ecosystem Services, Eco-Toxicity, Biomass carbon stocks and stock changes, etc".

An example illustrating our commitment to animal welfare is the RTF project: A GENOMIC APPROACH FOR IMPROVEMENT OF WELFARE TRAITS IN DAIRY CATTLE, discussed under Goals 1 and 2.

***No Non-achievements / underperformance has been reported***

## Income and expenditure statement

Income and expenditure statement	<a href="#">MSA Meissner_PRJ-0242_Q1 Report_Expenditure_2019.docx</a>
Unnecessary spending during period	No

## Popular Report

[MSA Meissner\\_PRJ-0242\\_Q1 Report\\_2019\\_Popular Report.docx](#)

## Additional documentation

No file has been uploaded

## Statement

Levy funds were applied only for the purposes stated in the contract	Yes
Levy funds were applied in an appropriate and accountable manner	Yes
Sufficient management and internal control systems were in place to adequately control the project and accurately account for the project expenditure	Yes
The information provided in the report is correct	Yes