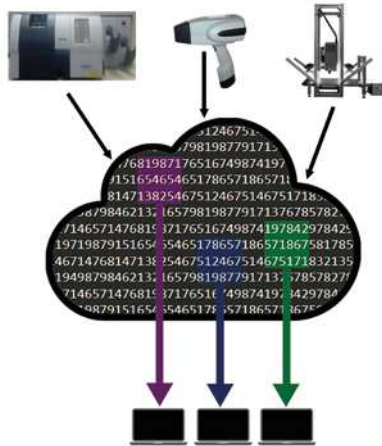# LOCAL BASED CHEMOMETRIC METHODS AS A SOLUTION FOR THE "BIG NIR DATA"

NEAR-INFRARED (NIR) SPECTROSCOPY HAS BEEN WIDELY USED IN MANY FIELDS BECAUSE OF ITS SPEED, NON-DESTRUCTIVE APPROACH, ENVIRONMENTAL FRIENDLINESS AND SIMPLICITY. NIR SPECTRA ARE MORE AND MORE INCLUDED IN THE KNOWN "BIG DATA" WORLD DUE TO NEW AND MORE ACCESSIBLE NIR TECHNOLOGY.

New improvements include the use of portable instruments allowing collecting data out of the lab as well as imaging systems that allows collecting even larger quantity of data. The objective is to use such large NIR datasets in a faster and effective way and directly on-line through a web cloud of potential users. The challenge here is how to give a fast and precise prediction service using the cloud and protecting the raw data at the same time. At the CRA-W, in collaboration with several foreign institutes, different "local-based" chemometric tools applied to NIR data have been proposed to speed-up modeling and predicting processes (Local Partial Least Squares – LPLS - and Local Partial Least Squares using Scores – LPLS-S). These "local-based" approaches have been tested on real data sets and compared with the classical global PLS method. The studies concerned the quantification of characteristic quality parameters in corn seeds and the prediction of the total β-carotene content of cassava roots.

In all cases, these strategies showed to be an efficient alternative to optimize predictions, when compared to classical global models. The results showed that local approaches could solve the non-linearity problem and at the same time they have permitted a drastically reduction of the calculation time without losing prediction accuracy.

These methods permit, not only to obtain quantitative predictions with improved performance compared to classical regression methods, but also to extend the prediction to more than one product from a unique and large data set. This means that the spectral library can be multi-products, which can also drive to the development of unique predictions with consequent savings in time and effort required to develop and maintain individual calibration models. Last, but not least, the proposed methods work, not with the original NIR spectra but with a compressed data, allowing then a protection of the raw data.

Juan Antonio Fernández Pierna, j.fernandez@cra.wallonie.be

ORGANISATION OF WORK ON FARMS IN WALLONIA, WHAT'S NEW?

PRESSURE OF WORK IS A SIGNIFICANT FACTOR IN WALLONIA FARMS.

Credit : CNIEL/C.Helsly

Thirty percent of farmers feel an urgent need to improve the way they organise their work, and forty five percent should ideally change their work methods.

Problem areas in the organisation of work in farming concern:
(1) the complexity of regulation and administration
(2) the pursuit of free time.

Farmers who diversify by providing accommodation, transforming their products or establishing educational farms face similar difficulties. Moreover, diversified farmers sometimes experience competition between the various activities taking place on the farm.

In response to the work pressure highlighted, a network of advisers specialised in work organisation has been created. It comprises 6 technicians belonging to Walloon agricultural agencies. To acquire the necessary skills, training that alternates theory and practice has been provided by two French institutions working in partnership with the CRA-W. By the end of 2017, around twenty farmers had enjoyed the benefits of labour consultancy. Inappropriate herd sizes in relation to the workforce, inefficient daily journeys within the farm (eg poorly located silos), working on multiple sites, or lack of communication between different workers are all factors with a negative impact on work organisation.

Various tools have been developed to help farmers manage their workload. Among these are a good practice guide to administrative management, a set of «hints and tips», a work diagnostic for «work" advisers and a directory of resource personnel to guide farmers successfully towards the most skilled discussion partner for each particular topic. The CRA-W is still working on this issue by producing work time references in agricultural diversification and cattle breeding.

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Amélie Turlot, a.turlot@cra.wallonie.be