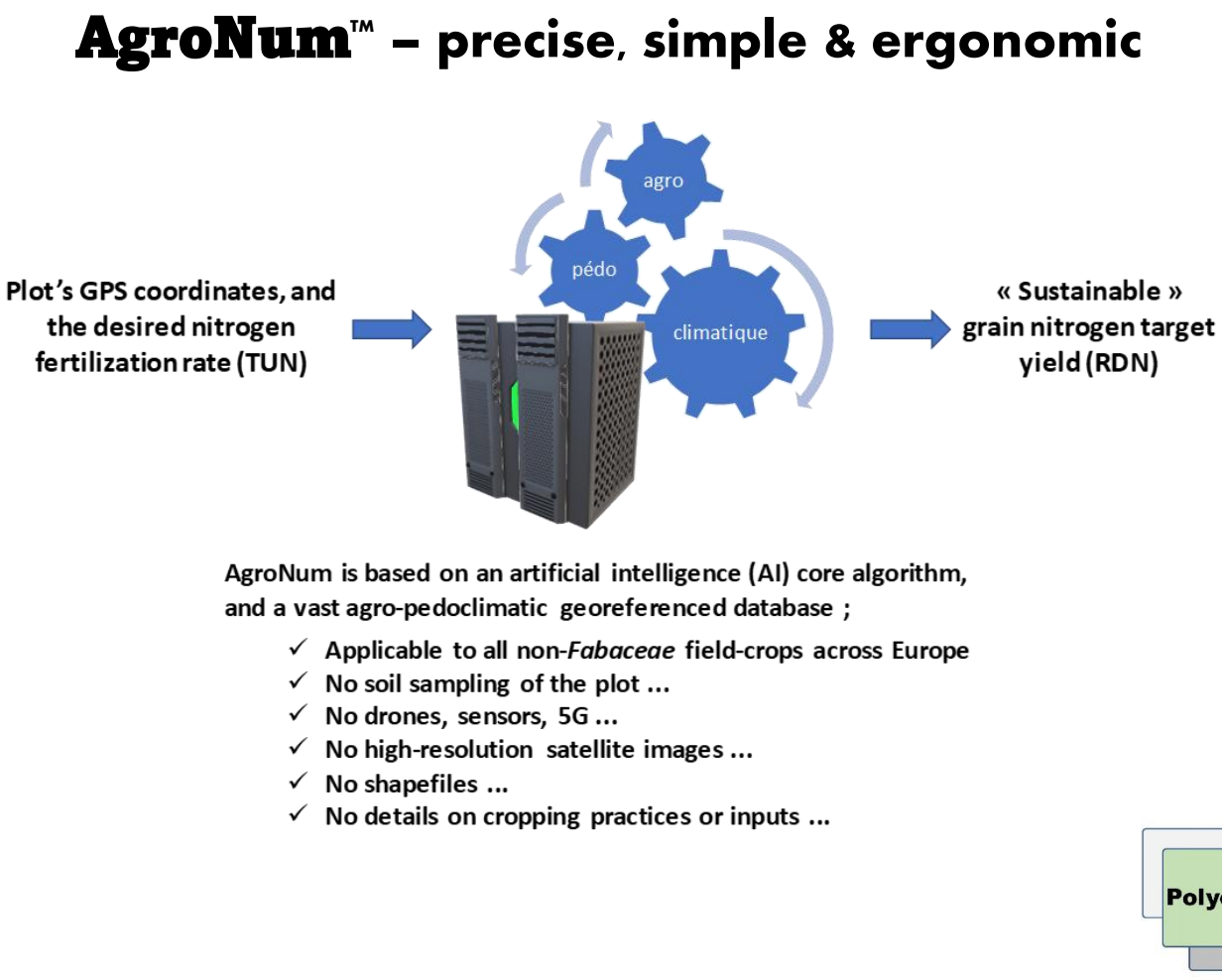
Slide 1 : Polyor SAS (www.polyor.fr) is a (very!) small R&D and agricultural consultancy unit based in Nancy (France). It has recently developed an artificial intelligence decision support system that sets sustainable targets for field-crop yields & their corresponding nitrogen fertilization rates.

A vast array of agro-pedoclimatic data was fed to a core boosting algorithm. The resulting meta-model – AgroNum™, is easily implemented using only GPS coordinates ; no soil sampling, sensors, IoTs, drones, high resolution remote sensing, or even shapefiles are required. A *dematerialized*, prototypic MRV scheme, in sort.

That said, AgroNum™ is first and foremost an ergonomic alternative – or rather a *complement*, to existing integrated fertilizer management schemes, and nutrient management plans.

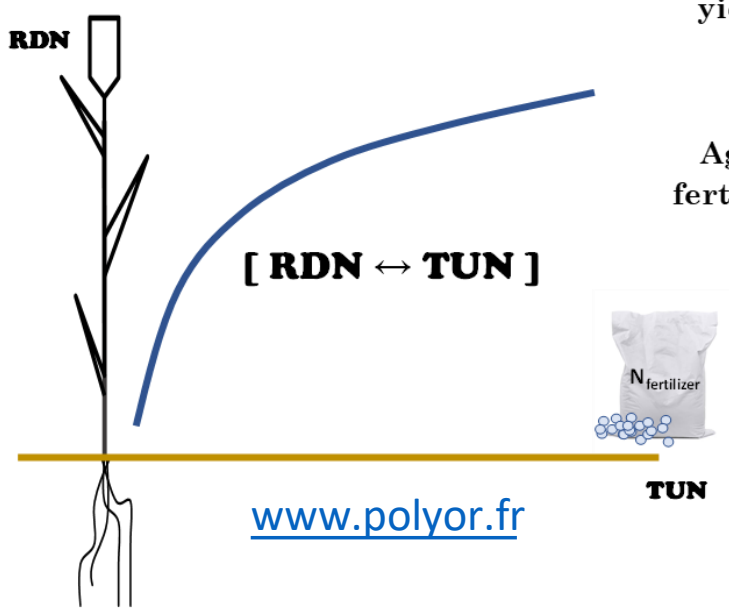


Slide 2 : AgroNum™ uses generic, plot-specific, nitrogen response curves applicable to *all* grain bearing non-Fabaceae field-crops across Europe.

Again, farmers need only indicate the plot's centermost GPS coordinates, along with their target nitrogen yield, or "offtake" ; the corresponding sustainable N-fertilizer application rate will be recommended. And vice versa, a desired N-fertilization rate triggers the corresponding sustainable nitrogen-yield recommendation.

By sustainable is meant nitrogen target yields and/or fertilizer application rates that lead to *intermediate* nitrogen fertilizer use efficiencies (NfUE), i.e. neither too low, nor too high, and thus conducive to SOM conservation, or even build-up on carbon-depleted soils.

AgroNum™ : one field-plot → one $N_{fertilizer}$ response-curve



AgroNum pairs targeted RDN N-grain yields (kg-N_g/ha) and TUN nitrogen fertilization (kg-N_f/ha)

AgroNum selects sustainable N_fUE fertilizer use efficiencies (kg-N_g/kg-N_f) neither too high/low

Polyor™

Slide 3 : More recently, and *apropos* economic value, such nitrogen-fertilizer response curves can be used to evaluate, *precisely*, so-called *refundable nitrogen credits* (or RNCs). These nitrogen credits are meant as a convenient, and valuable, alternative to carbon-farming derived carbon-credits.

RNCs are input oriented, and reward, at no additional cost to the user, existing soil conservation efforts by inferring the amount of supplemental nitrogen left to the crop residues at harvest, nitrogen that could have otherwise been harvested *for profit* in the grain.

This residue-nitrogen is valued, and a *valuable* service to the environment, and thus deemed … *refundable*, at par with the real-time market price of nitrate ammonium, for instance. This said, such refundable nitrogen-credits will be *small* as compared to publicized carbon-farming derived carbon-credits, but again at little or no additional cost to the farmer ; i.e. the ROI is meant to be high.

AgroNum refundable N-credits ensure *additionality* since only residue nitrogen *beyond* baseline sustainability are valued. More so, this crediting scheme is perennial, thus circumventing the usual *permeance* issue. *Leakage* is no longer an issue since RNCs imply yield increases. Finally, there is no risk of *mitigation deterrence*, since RNCs reenforce existing behavior rather than speculate on SOC stocks & accrual rates.

AgroNum™ : refundable nitrogen credits ≡ additionality