

# Innovation

## Activity report 2012–2013





*In the beginning of 2013, we consolidated the actions undertaken in 2012 and we structured Ovalie Innovation as an entity to support the professions and companies in the Maisadour and Vivadour Cooperative Groups. To this aim, one of the major objectives was to reinforce our ties both with people involved in governance and with people on the ground.*

*Through issues that are observed or signalled internally, and also through external dynamics (competitive clusters, calls for projects), major points of focus were confirmed as priorities in the innovation processes affecting our sector. As a result, the key words that stay with us (and that will be illustrated in this activity report) fall into three categories: "biorefinery", "circular", and "precision"... It is possible to think that these themes will probably be the subjects through which innovation will express itself in a very marked manner in the years to come. Adopting a position on these themes now is a strategic priority.*

*The subject of "biorefinery" is a concept that developed gradually over approximately fifteen years. The name comes from the analogy with petroleum refineries, which, beginning with a single product, generate a multitude of fractions that can be used in a variety of energy and chemical applications. Those applications began flooding our daily lives decades ago. In the same manner, the biorefinery concept is based on the hypothesis that a wealth of varied applications can come out of plant- or animal-based material, ranging from energy to plastics, or by using molecules with a high added value. These "green carbon" technologies and markets show a very encouraging trend for the future, thereby placing biomass producers in a very desirable position.*

*Biorefineries are only one step away from "circulars". A circular economy is an economy in which the waste generated by production or by a product becomes a resource for the next generation of production or products. This approach is presented as an inevitable reaction to the exhaustion (and/or high cost) of raw materials. In addition to the designs, often ideological, that gravitate around these subjects, let's not forget that biorefinery and circular economies have the same objective: to create and integrate the added value contained in the resources of a geographical area. Methanisation is one of the best examples of this approach.*

*Finally, in the wide range of innovative solutions for agriculture, we must retain the processes surrounding precision agriculture, which are enjoying increasing popularity, even if the trends for these technologies are rather chaotic at this point and will soon require careful selection to separate the wheat from the chaff. The development of guide bars is a good example of how an innovation entered a sector with the potential to change it in a positive manner. The objective of precision agriculture is still focused on the search for decision-making and action tools aiming to simplify/optimize practices. The same is true for the rationalisation of using inputs according to the exact needs of the plants, in both space and time. For farmers, the key prospects can be defined in terms of margin optimisation, compliance with regulatory requirements, record-keeping for practices, and even access to improved quality of professional life (and an attractive professional outlook for younger generations). Since the first remote detection attempts were made for keeping watch of crops, several applications have surfaced, using the latest guiding, sensing, and computer technologies. In our sector, with John Deere and other equipment makers, we are seeing several new players who "recycle" technology that has proven itself in other markets like cars and aeronautics: robotics, onboard electronics, drones, etc.*

*Ovalie Innovation is actively monitoring all of these areas and is participating in the dynamics that are expressed at the regional and national levels. Our objective is to develop partnerships that allow us to follow through with projects that are promising our Groups, with the perspective of offering new approaches that are complementary to the initiatives already in place, and also of building new economic models that are profitable for members.*

**Thierry Véronèse,**  
**Director of Innovation Development,**  
**Director of Ovalie Innovation**

## Governance

As a reminder, Ovalie Innovation went into business in January 2012 with the aim of uniting the research & development activities related to farm environments in both of Ovalie Agrofourniture's shareholder cooperatives. In the beginning, it was simply an R&D division shared between both Groups. During the summer of 2013, Ovalie Innovation became a simplified joint-stock company in its own right. This new legal status is an important event that will allow us to increase operational efficiency and the visibility of the structure.

Ovalie's goal is to lead the Maisadour and Vivadour Cooperative Groups toward economic competitiveness and performance, whilst helping them to meet corporate and regulatory expectations and also increasing and developing complete segments with higher added value, for both food products and non-food products.

Ovalie Innovation also carries out regulatory watch activities to ensure the compliance of the works carried out relative to corporate and environmental expectations.

### An interface within a network

Ovalie Innovation is also positioning itself as an external interface structure with the innovation networks identified as strategic. As such, Ovalie Innovation is a member of:

- The Agri Sud-Ouest Innovation competitive cluster
- The Pulséo de Dax association, dedicated to precision agricultural technologies (and has a seat on its science council)
- The AGIR food processing technical centre (and has a seat on its science council and board of directors)
- The Domolandes association, a cluster for sustainable construction in Saint-Geours-de-Maremmes
- The Centre for technological research on agro-resource chemistry, the Toulouse CATAR

Ovalie Innovation also has a seat on the science council at the INRA centre in Toulouse.

### Human resources

The structure is headed by a Scientific Manager, Thierry Véronèse, under the direct authority of both Managing Directorates. In 2013, the following two people joined our staff: Anne-Marie Busuttill, engineer trainee on a work placement from the Ecole Nationale Supérieure d'Agronomie in Toulouse, and Patrice Galaup, a recent graduate of VétagroSup in Clermont-Ferrand.

Since the beginning, Ovalie Innovation has received support from a Maisadour Innovation Steering Committee whose members are Régis Fournier, Jean-Louis Zwick, Pascal Azam, Marc Brugat, Michel Montet, and Frédéric Oriol.



### A technical club

In late 2013, a new initiative was undertaken with the creation of a multi-disciplinary technical innovation committee (C2TI) made up of "ground" agents from each cooperative. C2TI will form an integral part of Ovalie's governance strategy, as a complement to the regular exchanges with Maisadour and Vivadour management. The objective will be to create a "technical club" to:

- Work in a more in-depth manner on the technical aspects of the shared projects proposed by management from each cooperative
- Technically evaluate external proposals for which Ovalie Innovation is called upon
- Share experiences that the players from both cooperatives wish to address
- Optimise participation in outside events (congresses, AgriMip clubs, Coop de France, etc.)
- Stimulate cooperation, internal cohesion, multi-disciplinary aspects, and encourage exchanges between different professions

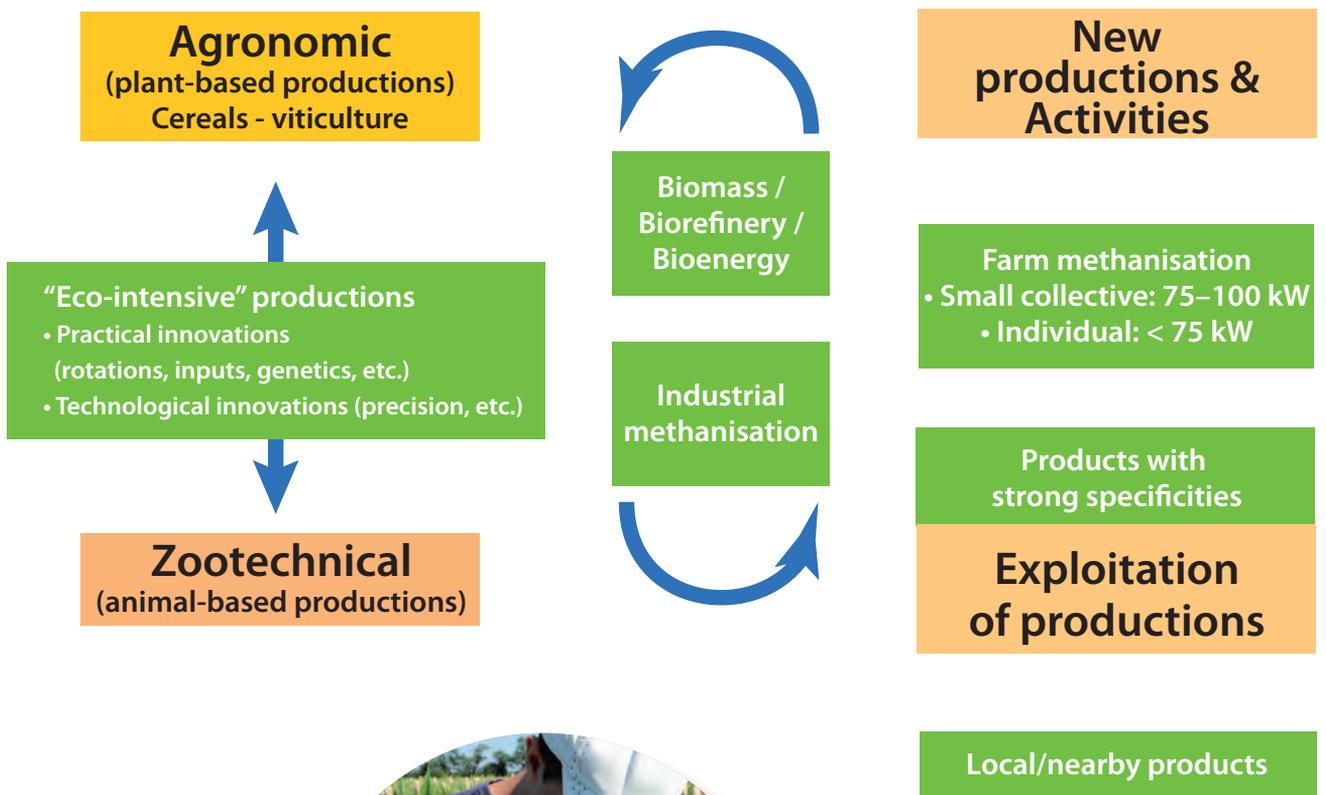
These meetings will be carried out on the basis of a precise agenda that includes project reviews, theme-based discussions, and special guest presentations (innovative companies, researchers, etc.). Furthermore, C2TI will offer to organise Innovation Clubs on certain topics that specifically involve farmers. Establishing these clubs will be one of the priorities for 2014.

# Drivers of innovation

To illustrate the main subjects that stimulate innovation in the priorities defined as founding elements for Ovalie Innovation, we propose the chart below, which expresses how these subjects are positioned:

- In the agronomical and zootechnical areas: the search for innovation allowing for the development of "eco-intensive" solutions
- In the new products area: a strong opportunity for the development of "purchasing local products"

- In the new productions area: the bioenergy opportunities (in which solar panels remain present) and contract crops for added-value markets
- Finally, at the interface: the levers of biorefinery and industrial methanisation make the connection between all the subjects and provide the structure for a "circular" organisation



# Biorefinery and circular economy dynamics

## Presentation

It's been at least fifteen years since the term "biorefinery" entered scientific jargon. It has gradually entered corporate and now industrial language. The origin of this concept was the vision that it would be possible to partially use biomass as a raw material in place of petroleum as a source of energy (biofuels, heating, electricity, etc.) and as a raw material in chemical manufacturing, whether it be for new products (i.e. bioplastics) or products that were analogous to petrochemical products: polyurethane and polyesters can be made from maize!

In 2010, as it relayed European and worldwide strategic studies, Adème published an overview report\* on the cereal (starch, sugar), vegetable oil, and lignocellulose (wood, straw, etc.) segments. The report provided the origins and varieties of the botanical species used, the composition of the harvests, their economic size, and the main producing countries, with the strengths and weaknesses of the French segments in comparison. We should add that animal by-products, which did not receive much attention, also play an important role!

The regions of Picardie and Champagne-Ardenne invested quite a bit in this approach with, first and foremost, players from the world of farming (Tereos, Champagne-Céréales) and with the 2005 creation of the Industry and Agri-Resources competitive cluster, which is specifically devoted to the subject. But let us remember that this subject is also part of the genes of the AgriMip Sud-Ouest Innovation cluster, and with cause: "green" chemistry originated in the French Southwest and the world's leading academic researchers in this field are located in the greater Southwest as well!

## The biorefinery in the AGROLANDES dynamic

*Ovalie Innovation has an active leadership role in the internal biorefinery debate, but also with players from the Landes geographic area, other companies, and corporate players to contribute to the local economic development initiatives included in the agro-cluster project in Mont-de-Marsan and Saint-Sever.*

This willingness to expand the debate to the level of the territory with a set of players is relevant in our eyes because, while the analogy with petroleum refineries as large, centralised structures with a single incoming product can be applied to certain plant-based approaches (this is already the case for paper factories, and the Tartas factory has gone in this direction), we won't always be able to apply it to multi-segment and multi-product approaches for technical, logistical, and other reasons. Because of this, rather than imagining large cracking units, it would be best to work towards the organisation of players in a geographic area. The idea would be more of local biorefineries, run by the synergistic and complementary nature of these players and by the way they organise themselves around the structuring elements: methanisation unit, composting platforms, etc.

## Process advancement and project dynamic in place

In 2013, we chose to centre our priorities on four main points:

- Re-examining the material resources available in our area
- Deciding how to best locate methanisation technologies so that they would be profitable and so that they would act as an economic foundation
- Sharing this approach with local players
- Beginning research and development programmes



## METHANISATION PROJECTS

In this context, we focused our attention on two priorities:

**Industrial projects:** In order to preserve the "foundation" function for an area (as opposed to a "destabilising" function) for industrial methanisation projects, we focused our attention on units based on the use of 40,000 to 60,000 tonnes of incoming materials collected within a radius of 30 km at most, with the objective of generating 1 to 3 MW of power for use either as electricity and heat (co-generation via a biogas engine) or as biogas injected directly into the grid.

Our research also led us to evaluate the feasibility of installing this kind of unit in the Saint-Sever area, which has a significant quantity of methanisable raw materials coming from local industries and farms, associated with the feasibility of finding additional materials in a supply radius of 30 km (target distance).

Today, the project is one of the subjects that the business club in Saint-Sever and the surrounding area has selected as strategic. Engineering firms are now studying the technical/economic feasibility of the project.

\*Panorama and development potential for biorefineries, Adème 2010. Download the report at <http://www2.ademe.fr/>

**"On the farm" or "small collective" projects:** in these cases, outside of the "supply radius" for industrial methanisers, the idea is to offer small units that can be operated by a farmer or group of farmers. In 2013, the challenge was to sort through the technological offerings, retaining those that were viable from a technical and economical standpoint. At present, three possible partners have been identified. Our ambition is to set up one or two pilot sites in 2014, in order to determine all the operating parameters for these systems which, after setup, will enable us to provide an offering that could be perfectly relayed by the Élevage Service company with whom we are working closely. As a reminder, the French Methane Production Plan (EMAA), launched in 2013 by the Ministry of Agriculture, specifically aims to encourage the development of agricultural methanisation facilities on farms, whether they are individual or collective, to reach 1,000 methanisers by 2020. This plan should allow for economic models that mobilise the government's support measures, such as the public investment bank (co-financing, guarantees, etc.).

### **NON-METHANISATION BIO-ENERGY PROJECTS**

Beyond the use of methanisable materials, the excitement surrounding biomass is also expressed in projects attempting to recover energy from biomass combustion or to sell pellets. Because of this, we are regularly called upon to offer a source of combustible materials such as agricultural by-products (i.e. straw) or short-rotation coppice (i.e. locust trees, paulownia, etc.). This requires in-depth reflection on our capacity to provide materials for these markets (in addition to the wood resources) via contract SRC production or via changes that optimise the extraction of (currently uncollected) materials in the field whilst leaving behind the required minimum.

It must be noted that this need for lignocellulose biomass does not apply only to combustion projects; second-generation biofuels and chemical companies will also be in great need of this in the near future.

### **Focus: R&D methanisation project undertaken by Ovalie Innovation**

*Even though this technology has reached maturity and must be optimised economically, there is one problem that cannot be ignored: the financial equation is penalised by the low agronomic (and therefore economic) value of the digestate. The Valodim project came about in this context. The project joins the Ovalie Innovation co-operatives with Arterris (project leader), Cap-Seine, and Vivescia, and partners with the Fertigaz company and public research laboratories (Irsta, INSA Toulouse, UTC Compiègne). Objective: to develop a process to process the digestate, thereby increasing its agronomic value. The project was approved by the AgriMip Sud-Ouest Innovation, Qualiméditerranée, and Industries-AgroResources competitive clusters.*

### **"GREEN" CHEMISTRY**

By "green chemistry" we mean using renewable materials, regardless of whether they are animal based or plant based. After agriculture and energiculture, we are now entering an era of "chemistriculture".

The challenge is to meet the growing needs of an industry that would like to incorporate this type of material in finished products that, as we have seen, can be quite varied.

In this context, two approaches must be compared:

- First, developing products that have the same values in usage as petrochemical products (i.e. a lubricant made from vegetable oils that can be used for the same applications as mineral oil, without actually being mineral oil)
- Second, providing building block molecules that are identical (or nearly identical) to those used in petrochemical manufacturing, to produce identical finished products (ethanol, ethylene, butanol, etc.): these are called "platform" molecules

The industrial applications of green chemistry are multiple, and some are already in widespread use:

- Biomaterials from green chemistry, 100% natural: natural insulation (in construction) or composite materials (for cars)
- In fine and specialised chemistry: active agents for chemical, pharmaceutical or food processing industries (bio-solvents, bio-lubricants, surfactants, inks, paints)
- In basic chemistry: the famous platform molecules (also known as synthons or building blocks) from which it is possible to synthesise, through chemical recombination, other, more complex molecules (polyurethane, polyester, acrylates, solvents, resins, etc.). Opposite: an illustration of outlets for the cereal segment in particular (source: Adème Biorefinery report, 2011).



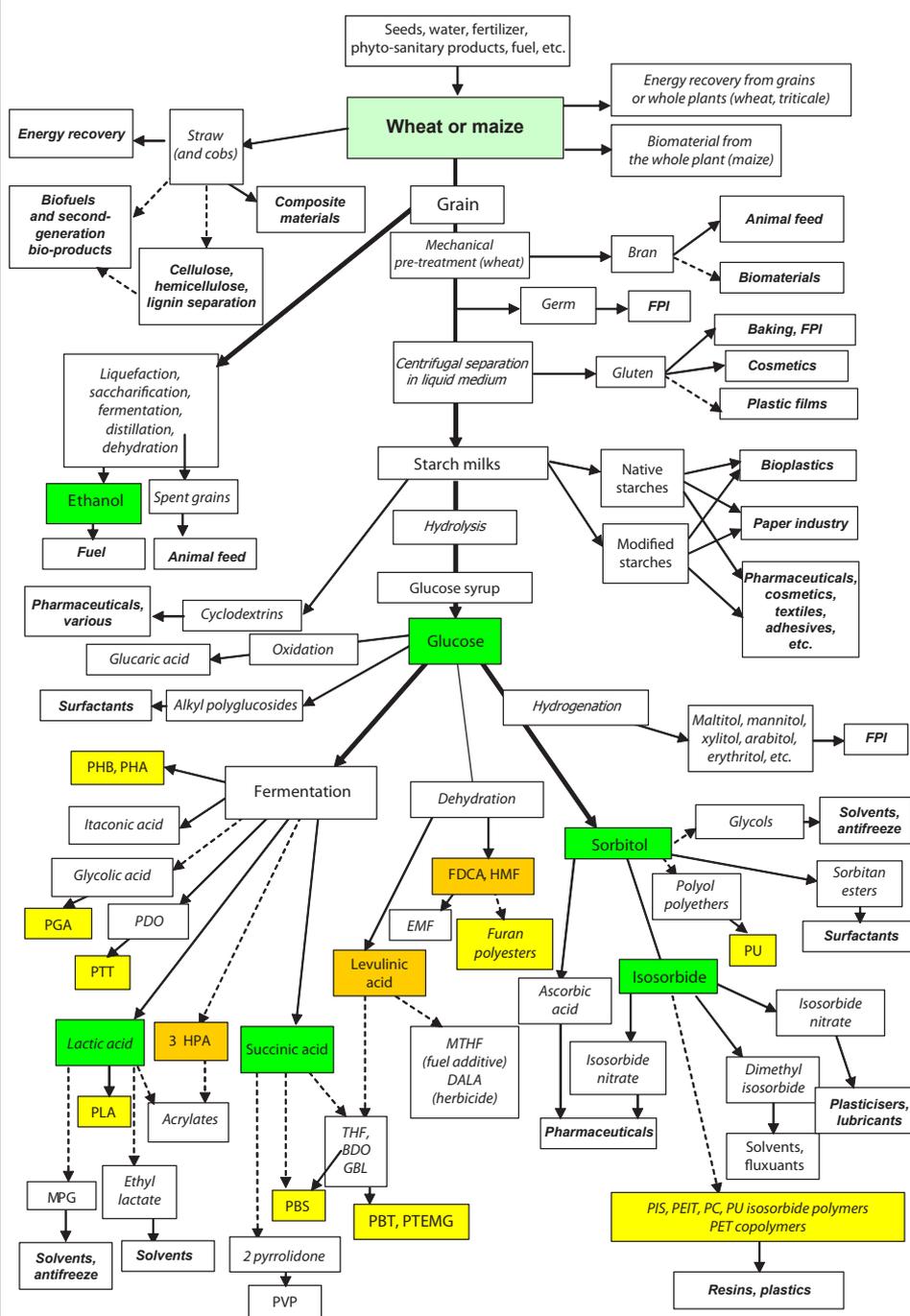
**OVALIE INNOVATION'S GREEN CHEMISTRY PROJECTS**

A variety of collaborations have begun (they are confidential at this point but we can discuss the principles).

- **Participation in the BEMA programme:** participation in a consortium of nine partners (including Arkema, Smurfit, the University of Pau, and others). The goal of this project is to develop new generations of adhesive mixtures and composite materials using renewable raw materials produced in Aquitaine.

- **Collaboration with the Procedures and Organic Systems Engineering Laboratory (INSA-INRA-CNRS mixed unit):** study on the value and extraction of an added-value molecule as an ingredient in cosmetics and food processing.
- **Collaboration with the Toulouse INP Mixed Unit Agro-Industrial Chemical Laboratory – INRA:** two main subjects are being studied: one on the new active ingredient production segment for cosmetics using aromatic species, and another on the recovery routes for by-products from chicken and duck abattoirs.

**BIOREFINERY OF MAIZE/WHEAT SEGMENTS**



Source: Ademe Biorefinery report, 2011).

• **Partnership with Végéplast, a company in Tarbes:**

- 1 - 2013 launch of a collaboration for Delpéprat: development of a new generation of biodegradable/bio-sourced packaging (co-funded by the Aquitaine region).
- 2 - agreement to collaborate on the subject of recovering agricultural and food-processing products and by-products for the production of new bioplastics. Thesis programme with the Procedures and Organic Systems Engineering Laboratory (INSA-INRA-CNRS mixed unit).

**CIRCULAR ECONOMY PERSPECTIVES**

Drawing on the previous observation, we can attest to the connection between the previous subjects and the determination of added value in our territory, whilst simultaneously recycling elements that are essential to the sustainability and competitiveness of our segments.

We hope that it is easier to see how such a process operates, process in which we are able to:

- retain the raw materials on location, rather than exporting them
- use them to the best of their potential rather than eliminating them
- recycle them to limit the need for incoming supplies, as is typically the case for fertilisers

## The dynamics of precision agriculture

### Presentation

Dependency on machines is becoming more and more apparent from one trade show to the next, where innovations are beginning to centre on onboard electronics and computers. The leading equipment manufacturers are actively investing in this area.

At Ovalie Innovation, we are constantly in contact with the staff from the Maisadour and Vivadour agronomic divisions, for the purpose of aligning our actions with the studies and experiments carried out by these people. Our objective is to complete their actions in the best manner possible and to anticipate the movements that are underway in specific areas, especially in innovative technologies.

With this perspective, we have taken positions in cutting-edge projects. Our ambition is to be as close as possible to the development of these technologies so that they are developed ac-



ording to specifications that we can sign off on. In return, this will allow us to be a step ahead in integrating these innovations and in checking their soundness and their compatibility with our needs. We are keeping the development of new services for members of the cooperatives in our sights.

### Projects underway in "Precision Irrigation":

#### ADVANCE OF THE IRRIS PROJECT (APPROVED BY THE EAU COMPETITIVE CLUSTER):

Presented in the 2012 report, this project has reached the stage where our partners are developing the new sensor. In 2014, Vivadour and Maisadour will mobilise resources to confirm the value of the prototypes.

#### Summary

Guiding irrigation requires proper knowledge of soil needs and real-time needs as provided by tensiometric or capacitive sensors. Such technologies have their limits, both technically and economically speaking. The IRRIS project hopes to resolve that problem by developing a revolutionary new sensor which is more reliable, more effective, and less expensive.

- Duration: 3 years. Overall budget: €1.6m.
- Financed in part (50%) by the Ministry of Industry as part of the Eco-Industry call for projects.
- In partnership with TCSD, Measurement Specialties, Comptec, and the ENSAT and CNRS laboratories.



#### THE MAISEO PROJECT (APPROVED BY THE EAU AND AGRIMIP SUD-OUEST INNOVATION CLUSTERS):

Moving towards a complete service for maize farming that is more tolerant of hydric stress.

#### Summary

The project emphasises reducing the consumption of water, energy, and nitrogen fertilisers whilst retaining/increasing yields and margins. The MAISEO service offered to farmers will be based on a Genetic/DMT/Recommendation package

allowing farmers to optimise the soil/hybrid pair for improved resistance to hydric stress and irrigation guidance on the scale of the plot. The CACG, which manages water in the Neste basin, is simultaneously working on managing water at the territorial level, according to crop rotations and their foreseen needs.

- Duration: 4 years. Overall budget: €4.4m.
- Subsidised at a rate of 50% by the Ministry of Agriculture as part of the Interministerial fund for competitive clusters (FUI), by the Adour-Garonne Water Agency, the Midi-Pyrenees Regional Council, the Hautes-Pyrenees General Council, and the Feder fund.
- Headed and coordinated by Vivadour.
  - In partnership with the Pioneer, Géosys, and Gascony hills planning (CACG) companies, with the CNRS, CNES, Sabatier Cluster University, and Météo-France laboratories, and with support from Adème.

**The DécidAIE project: how to achieve compatibility between systems and machine dependency**

The Convergence cooperatives (associating Terres du Sud and Arterris) are involved in this project, which requires arbitrage from our sector. The project is a result of the fact that observation technologies and onboard systems do not always result in compatibility that allows for a full, automatic cycle from observation to the implementation of recommendations. The objectives truly apply to the creation of a single operating system (i.e. Android), in view of unifying and creating compatibility between the systems used, from the point when information is collected (whether this is done via satellite or on the ground) to implementation in the field via

communication between the Isobus terminals in the tractors and machinery being guided. The DécidAIE project relies heavily on two companies: C-S (specialised in information systems) and ACTIA (one of the world leaders in onboard electronics). We are still closely monitoring this project, part of which is to create a specific company that Ovalie Innovation could partner with in the future.

**Another kind of agronomic dynamic**

Caroline Roussy's thesis on innovative crop systems

*In partnership with the agronomic divisions, this thesis, begun in October 2012, focused on two crop systems used extensively in southwestern France: maize monoculture and a rotation of durum wheat and sunflower. In surveys with farmers and experts from the cooperatives and research institutes, the main drivers and obstacles to the evolution of these systems became apparent. A questionnaire, which will be given to 400 farmers in 2014, was designed to reveal the perceptions and preferences of the farmers for adopting new practices. A close analysis of the determining factors for change amongst farmers will make it possible to identify the crop systems of tomorrow and to have an assessment of perceived risks. The end result is that we will be able to offer appropriate solutions and to organise support and targeted action plans according to farmers' needs.*

Thesis co-funded by Adème (2012–2015)

Associated with the economic research laboratories of INRA (Rennes UMR SMART) and the Ecole d'Ingénieurs de Purpan (Toulouse).

In partnership with the Arterris and Terres du Sud cooperatives, with support from the Water Agency and Arvalis Institut du Végétal.



## Zootechnic dynamics

2013 was devoted to launching and leading the three projects below, begun in 2012:

### **THE KOMPLANTES PROJECT WITH NUTRICIA**

(approved by the AgriMip Sud-Ouest Innovation competitive cluster): "bio-products" to fight against coccidiosis in chickens.

#### **Summary**

The project aims to develop plant extracts obtained through fermentation technology, which takes carefully selected plants to achieve the overexpression of microbial agents and biostimulants for animal immune systems. The project will provide scientific proof of the effectiveness of an innovative alternative. The anti-parasite preventive qualities will be studied through in vitro and in vivo testing. We hope to have a range of natural products combined with feed that are effective and very competitive in relation to essential oils, to help chickens fight coccidiosis whilst also benefitting from an undeniable image boost. This is a promising project that is benefiting, starting this year, from the brand-new measures of the Station Expérimentale d'Élevage (experimental breeding station).

Nutricia is funded by the Aquitaine Regional Council.

The project is in partnership with the Caribou and Symbiotec companies and the laboratories at the Ecole Vétérinaire (veterinary school), the Toulouse INSA, and the El Purpan (engineering school).



### **SEGMENT-WIDE SANITARY ISSUES**

Upon recommendation by Delpéyrat, in 2012 we began implementing a research measure that will allow us to better manage the sanitary quality of the products, and therefore the associated economic risks. This work is continuing and we are planning a large-scale operation in 2014, which we are currently structuring, with scientific partners.

### **THE MEALWORM PROJECT (DEVELOPMENT PROJECT): A BIOLOGICAL AND TECHNOLOGICAL BATTLE**

#### **Summary**

Mealworms are the insects responsible for destroying insulation panels in chicken breeding houses, and they may also be associated with sanitary hazards. One of the core activities of our partner AB7 is developing active "polymers". The company uses these, for example, in anti-parasite collars. The goal of the project is to use these properties to develop products that control mealworm infestations.

#### **Progress**

2013 was a rich year for this subject. We learned to better understand the behaviour of these insects in breeding conditions (work placement of Malcom Vasselle, University of Amiens master of entomology). We have now identified technical solutions that we must evaluate in 2014 with regard to the economic requirements of the breeders. The challenge remains that of providing an effective solution that allows breeders to forego the use of current insecticides and larvicides. Our objective is the same: to identify a viable solution by mid-2014.

## The dynamics of "local" feed

The "locavore" trend of sourcing products that are produced within close range of where they will ultimately be consumed is really taking off. Some consumers expect higher quality, which to them is synonymous with better traceability in terms of identity. The cooperatives are right to address this phenomenon. Ovalie Innovation and Maisadour's store segment began cooperating in 2013 to better evaluate the positions to be taken in this area. To be continued in 2014...



## **Network activities**

*Staying open to stay ahead* is key in the world of innovation.

Ovalie Innovation hopes to establish connections between key players in innovation, be they public research laboratories, innovative businesses, interface or finance structures, etc.

Ovalie Innovation is a member of:

- The AgriMip Sud-Ouest Innovation competitive cluster
- The Pulso association, dedicated to precision agricultural technologies (and has a seat on its science council)
- The AGIR food processing technical centre (and has a seat on its science council and board of directors)
- The Domolandes association dedicated to green building

Ovalie Innovation has a seat on the science council at the INRA centre, Toulouse.

*Other notable partners:*

- Convergence Innovation (with the Arterris and Terres du Sud cooperatives): our four cooperatives have introduced regular consultations to maximise our effectiveness on projects which can be conducted jointly.
- GIE Aromagri Maïsadour/Biolandes for research into added value for plants or other raw vegetable matter.
- Coop de France.
- Midi-Pyrénées Innovation.
- EAU and Aerospace Valley competitive clusters.

## **Innovation steering committee**

Two steering groups have been set up – one for Maïsadour, the other for Vivadour – to support the structuring of Ovalie Innovation and its strategic choices.

### **Maïsadour Innovation steering group**

**Thierry Véronèse, Director of Innovation Development**

Pascal Azam, Marc Brugat, Régis Fournier, Michel Montet, Frédéric Oriol, Jean-Louis Zwick

groupe coopératif  
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