From Tropical Crop Breeding to Industrial Processing:
Integrated data management with a Research Resource Planning

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Tropical crops intended for industrial purposes such as Cocoa, Coffee, Cannabis, Tobacco and Sugarcane require specific research and development to ensure the availability of quality production at the best cost. Complex research processes are involved, and huge amounts of data generated at every step of the transformation process, from plant breeding to sensorial analysis, including agronomical insights, raw material production and industrial processing. It’s a key issue to integrate the whole research activity and take the good decisions to address the goals of the industrial organization.

Combined with the needs of the market, generated by an integrated chain of return of experience from the food industry and from end-consumers, it makes data management a real challenge for agro-industrial research centers. As the raw product transformation sector is strongly involved into breeding, R&D organizations¹ have to deal with new insights and settle strategies and processes to give efficient responses for better seed performances and quality of the end product transformation process.

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Information Management Insights For Tropical Crops Breeding And End Product Processing Quality

- Consumer concerns
- Market demand
- Environmental constraint

Agronomy benefits
- Traceability labels
- Varieties selection
- Pests management
- Seed quality

Modern breeding techniques such as genomic and marker assisted selection, combined with high throughput phenotyping generate huge amounts of information to improve traits and resistances to environmental constraints. In addition, through GxE analysis breeders can provide industry a stable quality of coffee grains regarding environment variations.

To comply with the needs of the market, generated by an integrated chain of return of experience from the food industry and consumers, breeders can propose seed traits compatible with processing standards.

New relevant societal expectations for transparency also impacts breeding organizations and their information systems by requiring a fine traceability of the seeds in terms of production, genetic origin and transformation.

Therefore, data management becomes a real challenge to make this information a source of improvement in breeding.

Skilled Information System teams build integrated data management and analysis approaches, based on a Research Resource Planning² and collaborative database systems, to support innovative long-term processes such as Coffee pedigree breeding, agronomic research and laboratory analysis.

The solution proposes all-in-one tools with (I) Data warehouse capacities for heterogeneous information management from multi activities (II) Process-oriented software for daily R&D work planning and monitoring (III) Data analysis tools for advanced reporting and decision making assistance.

Benefits of an RRP (Research Resource Planning) for plant breeding

- Real time data management from the breeding to the sales department increases the reactivity and decision-making during field works.
- Encourage collaboration between researchers. Improves data sharing quality, and reduces the redundancy of information to save resources and investments.
- Standardize and industrialize processes to improve the efficiency of the work and save time.
- Valuation of research data lets breeders centralize and compile phenotypic, genomic and environmental information and extract the best indicators.

¹ Research departments of seed companies rely on RnDExperience™ to achieve their breeding objectives, such as ASTREA, one of the biggest Tabacuco brand, and Bio-T, leader in Cotton seeds in China www.doriane.com/en/success-stories
² Royer F, Enterprise Integrated Data Management, ERP and RRP, in the Seed Business, SeedQuest (2009) : “For research departments, these ecosystems of software are replaced by RRP.

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