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Embrapa Agrienergy and Bioinformatics

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The characteristics of the Brazilian Agrienergy Plan - 2006-2011 (PNA) assign Brazilian Agricultural Research Corporation (Embrapa) a leading role because of its comprehensive research network extending over the entire country and its facilities abroad (LABEX), as well as cooperation programs with several developed and developing countries. To achieve the challenges of PNA, in 2006 Embrapa created the Embrapa Agrienergy (CNPAE), as a Research, Development & Innovation (RD&I) thematic unit, whose headquarter is being built in Brasília/DF. It's construction project addresses thematic, environmental and operational concepts in a building with modern laboratories and pilot plant. The CNPAE's mission is to 'Enable innovative technological solutions for the sustainable and equitable development of the Agrienergy business in Brazil, in benefit of the society'. It's vision is 'to be a national leader in generation of knowledge, technology and innovation in Agrienergy'. It's working structure has three dimensions: agronomic, industrial and transversal studies, and four platforms: ethanol, biodiesel, energetic forests and residues. The RD&I is structured in five Thematic Laboratories: Biology of Energy Crops and Microorganisms Lab (including a Bioinformatics Lab), Energy Feedstock Processing Lab (including a Pilot Plant), Co-products and Residues Lab, Agrienergy Knowledge Management Lab, and Chemical and Instrumental Analysis Lab. The Biology of Energy Crops and Microorganisms Lab (LBE) develops basic research in biology for energetic crop improvement and aiming the enhancement of conversion processes. It focuses on the utilization of high-throughput technologies (genomics, transcriptomics, proteomics and metabolomics) for the development of biotechnological tools; development and genetic manipulation of microorganisms and plants of interest to Agrienergy; analysis of biochemical processes of synthesis, degradation and modification of biomass polymers; and characterization of the composition, structure and chemical patterns of different biomasses. One of the research themes of LBE is Bioinformatics, which applies information technology to the solution of biological questions, in our case those relevant to bioenergy. It will involve various analysis such as: assembly, annotation and mining of genomic structures (genes, repetitive elements and regulators, etc.),

metagenomics data analysis, genotyping and phenotyping, selection of molecular markers, construction of biological databases and provision of computational tools. The Bioinformatics Laboratory (LBI) will soon move to a new space (which is under construction) with a work room and a Datacenter. In the Datacenter, currently our rack have three servers with total computational capacity of 12 Quad processors, 2 TB of disk and 384 GB of physical memory; two storages capable of storing over 15 TB of data and a backup robot. The initial efforts of the LBI team are focused in creating the Laboratory facilities, buying and installing the basic equipments, and in starting the analysis of the data already generated for Oil palm (mainly DNA assembly, transcriptomics, SNPs and infrastructure) and Physic nut (infrastructure). The near future challenges includes transposable elements, molecular markers, genome wide selection and microorganisms genomics and transcriptomics. The LBI team work in collaboration with other Bioinformatics teams of Embrapa (CNPTIA) and universities (UNICAMP - LGE), to whom we are grateful. Soon we will announce scholarships opportunities. Sources: (1) Embrapa Agroenergia - Conceitos, estratégia e estrutura de trabalho. Institutional folder. Embrapa; (2) I Plano Diretor da Embrapa Agroenergia: 2008-2011-2023. Brasília, DF:Embrapa Agroenergia, 2008. 43 p; (3) Brazilian Agroenergy Plan 2006-2011. MAPA, Brasília, DF:Embrapa, 2006. 108 p.