

Sweetfuel - Relevance and Progress



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Vision and mission

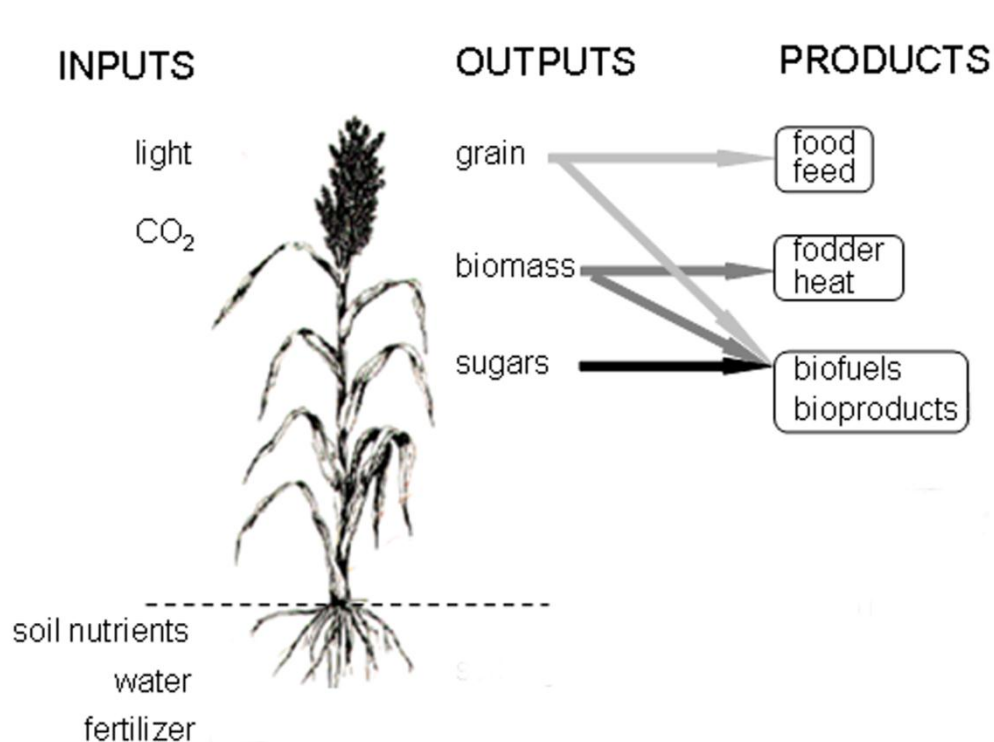
Vision : A prosperous, food-secure and resilient dryland tropics

Mission: Reduce poverty, hunger, malnutrition and environmental degradation in the dryland tropics



Introduction to sorghum

- Fifth most important crop >42 m ha
- Human consumption in Asia and Africa
- Animal feed in Americas, China and Australia
- Crop residue as good fodder



SSVC consists of two models:

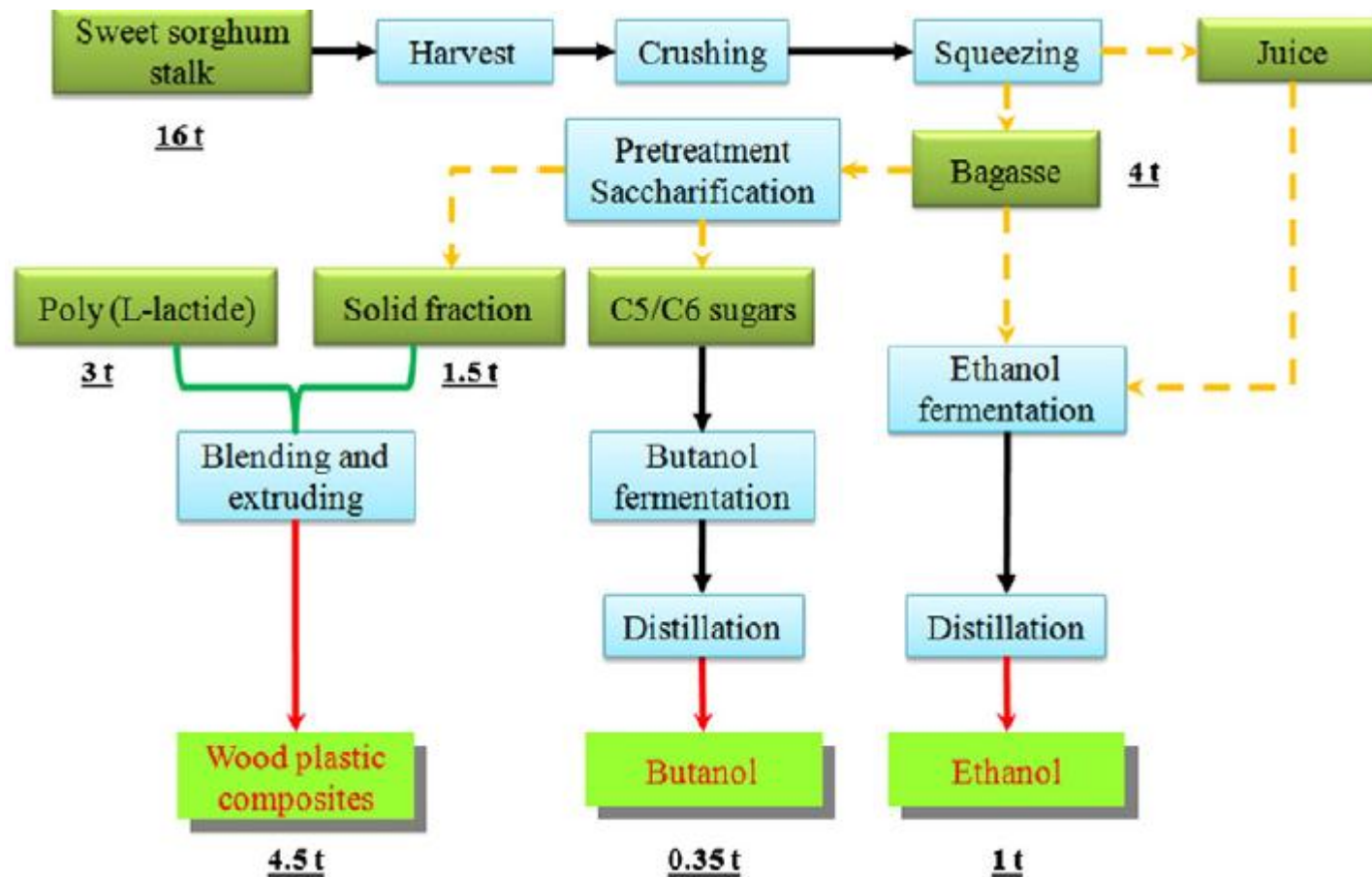
1. Centralized model (Rusni, AP & TCL, Maharashtra)

1 t stalks → 350-500 kg juice → 44 L ethanol (Lab);
45 L (Rusni); 50 L (Praj); 50 L (DA-BAR)

2. Decentralized model (Ibrahimbad, AP & Parbhani, Maharashtra)

1 t stalks → 280-400 kg juice → 50-80 kg syrup →
16-26 L ethanol





Partner 1

Coordinator

WP4 and WP8 leader



Centre de coopération internationale en
recherche agronomique pour le développement
(CIRAD / France)

Partner 2

WP2 leader



International Crops Research Institute for Semi-Arid
Tropics (ICRISAT / India)

Partner 3

WP3 leader



EMBRAPA Maize and Sorghum (Brazil)

Partner 4

WP1 leader



KWS SAAT AG (Germany)

Partner 5

WP6 leader



IFEU - Institute for Energy and Environmental
Research Heidelberg, Germany

Partner 6 WP5 leader



**Alma Mater Studiorum – Università di Bologna
(UNIBO / Italy)**

Partner 7



Università Cattolica del Sacro Cuore (UCSC / Italy)

Partner 8



**Agricultural Research Council – Grain Crop Institute
(ARC-GCI / South Africa)**

Partner 9



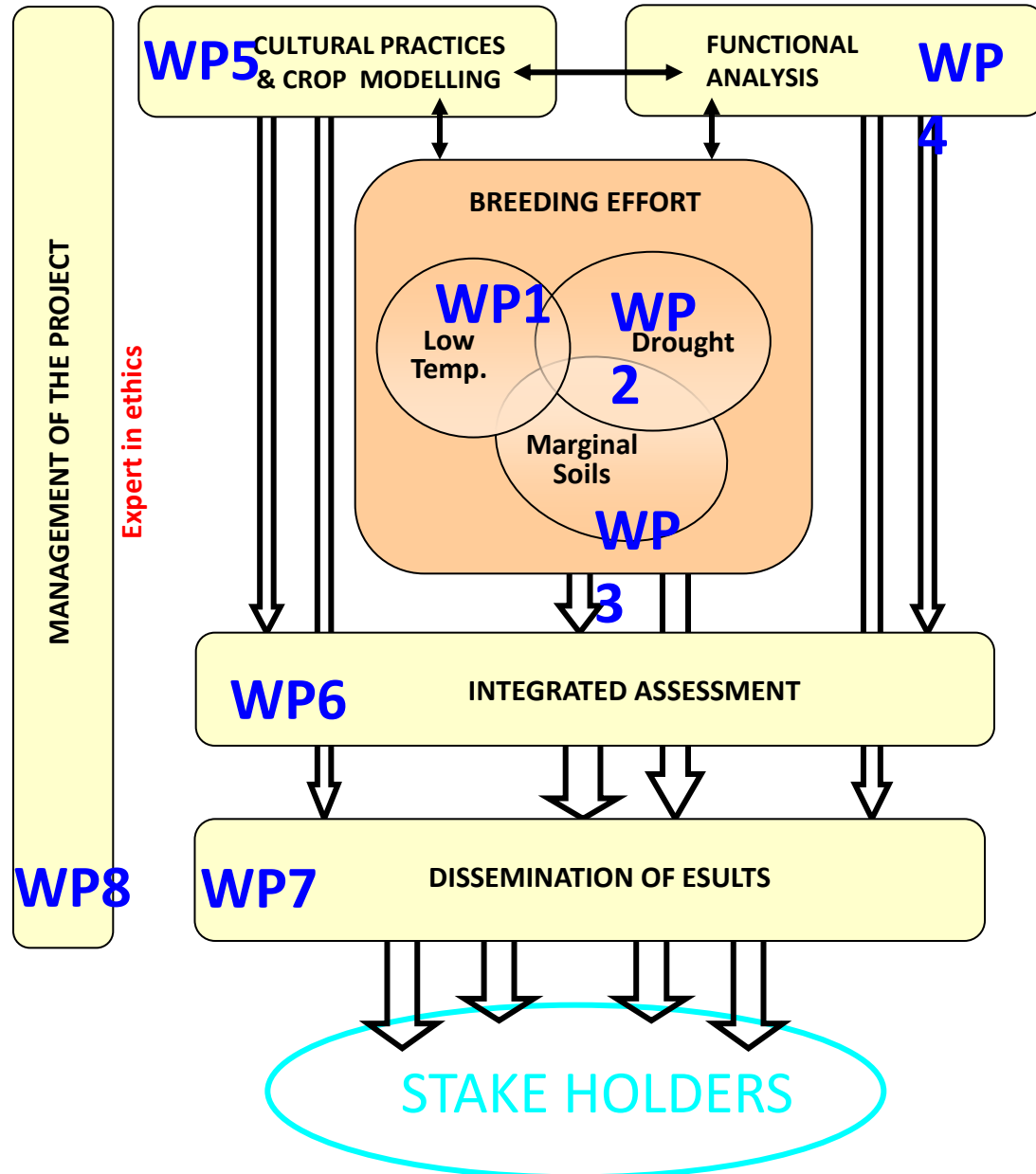
**Universidad Autónoma de Nuevo León
(UANL / Mexico)**

Partner 10 WP7 leader



WIP - Renewable Energies (WIP / Germany)

Organization of the work



Tasks—WP2

2.1

Identify promising sweet sorghum hybrids

- *Seed increase and exchange of germplasm*
- *Multilocation testing to identify promising hybrids*

2.2

Screen sorghum core germplasm accessions and reference collection

- *Identification of potential donors from germplasm*
- *Screening of reference collections*

2.3

Develop promising hybrid parents for high sugar and grain yields

- *Hybrid parents for rainy season adaptation*
- *Postrainy season adapted improved hybrid parents*
- *Develop sweet sorghum hybrids for both the seasons*

2.4

High biomass yielding brown midrib (*bmr*) hybrid parents

- *Identification of promising donors from germplasm*
- *Develop *bmr* hybrid parents*

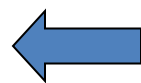
2.5

Stay-green hybrid parents with drought tolerance

Screening for terminal stress



Tolerant genotypes under terminal stress



Susceptible genotypes under terminal stress



Screening for midseason stress



**Genotypes showing
varied drought
tolerance
mechanisms**

**Productive genotypes
under drought**





Sweet sorghum distilleries - India- Rusni and TCL



- **PROALCOOL (*Programa Nacional do Alcool*) Program initiated in 1975**
- **Govt. extended support initially, now self sustainable**
- **Sweet sorghum extends sugarcane distillery operation**
- **EMBRAPA SS Variety, BRS 506 recorded 2500 l ha⁻¹ in 1500 ha pilot study in 2011; 1.8 M ha identified for SS cultivation**
- **Govt actively supporting SS cultivation**
- **Ceres/Advanta identified SS hybrids from pilot studies**
- **Seed production indent with EMBRAPA for 2013: 20, 000 t**



Scenarios for Sweet Sorghum in Brazil



- ❖ Sweet sorghum is being proposed to be planted at the beginning of the rainy season in areas of Sugarcane renovation to increase the period of operation of large distilleries in Brazil by up to 100 days

Bioenergy Calendar

O sorgo é plantado e colhido na entressafra da cana, nos meses de novembro a abril

NOV • DEZ • JAN • FEV • MAR • ABR • MAI • JUN • JUL • AGO • SET • OUT • NOV

120 dias ►

■ Plantio de sorgo ■ Colheita de sorgo ■ Colheita de cana

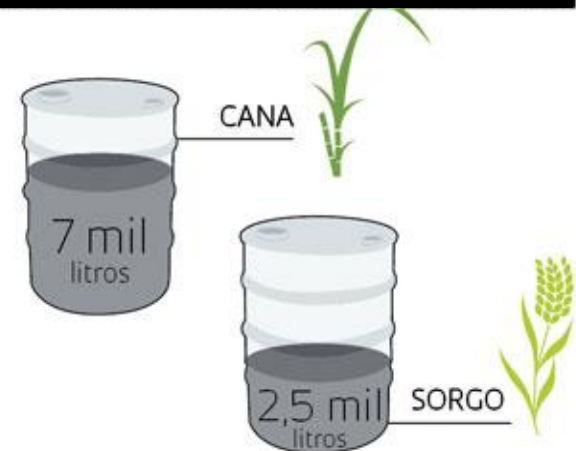
FONTE EMBRAPA

Embrapa

Milho e Sorgo



Ethanol Production L ha⁻¹



Courtesy: Robert Scheffert, Embrapa, 2012

What makes SSVC sustainable ?

- Use of multi-feed stocks (year-round operation) and production of multiple products and by-products
- Focused target area instead of dispersed
- Strong agricultural R4D set-up and supply-chain management
- Mechanized crop production and harvesting
- Customized crushers and processing
- Favorable policy environment





The way forward

■ INDUSTRY

- Sweet sorghum as a source of feedstock in a multi-feedstock unit
- Grain and by-product utilization besides bio-product development

■ RESEARCH & DEVELOPMENT

- Improved cultivars for local adaptation
- Seed systems development
- Harvesting and processing technology
- Capacity building
- Government policies

Thank you

