Centre
de coopération internationale
en recherche agronomique
pour le développement

CIRAD

Public institution status

CIRAD is an industrial and commercial public establishment (EPIC), placed under the joint authority of the Ministry of Higher Education and **Research** and the Ministry of **Foreign and European Affairs**.

Its operations fit into the "**Research in the field of environmental and resource management**" category of the State Finance Law

A mandate

Targeted research to contribute to development and poverty alleviation.

Research centring on the **Millennium Development Goals**.

Research in which **methods and knowledge are built in partnership** with stakeholders in developing countries.

Six priority lines of research

- Ecological intensification (Inventing new types of agriculture that optimize yields and preserve biodiversity)
- Biomass energy (Studying new sources of energy and analysing how to ensure that they benefit people in developing countries)
- Food (Innovating, to ensure accessible, safe and varied food supplies)
- Animal health and emerging diseases (Foreseeing and managing infectious disease risks linked to wildlife and domestic animals)
- Public policy (Supporting policies aimed at reducing inequality and alleviating poverty)
- Rural areas (Understanding relationships between agriculture and the environment and between nature and society better, so as to manage tropical areas sustainably)

Human resources

A staff of 1800, including 850 researchers

1200 staff members in metropolitan France

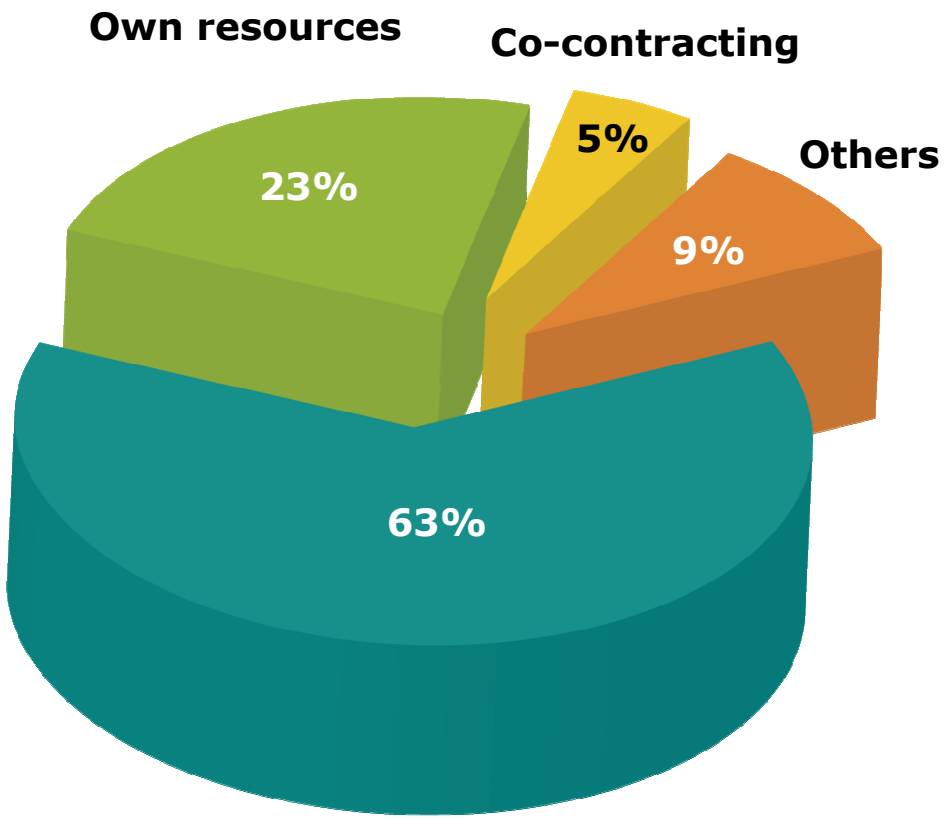
600 staff members outside metropolitan France

(400 in the French overseas regions,
200 in other countries)

A budget of 203 million euros

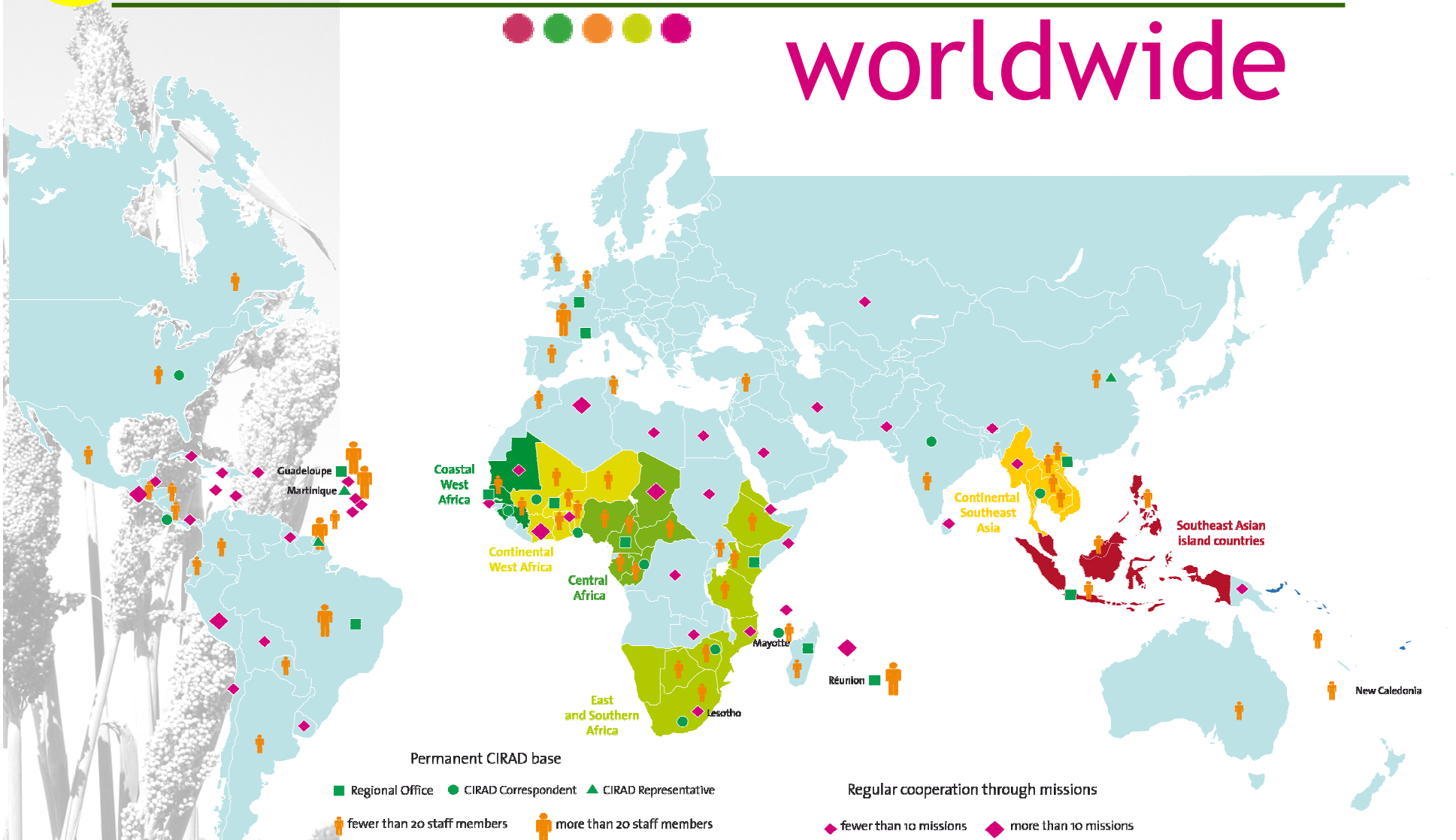
Contractual resources: 37%

Grant for public service costs (SCSP): 63%



Sweet Fuel

CIRAD worldwide



CIRAD

Sweet sorghum : an alternative energy crop



Text of the call

KBBE-2008-3-1-02: Sweet sorghum – An alternative energy crop for biofuel production in semi-arid and temperate regions – SICA (Latin America, South Africa, India)

Sweet sorghum is a promising alternative crop for bioethanol production. Moreover, it is a "foodfuel-energy-industrial crop" which ranks fifth among the world's grain crops, requires low water/fertiliser input, has a high yield of grains and biomass (starch/sugars/lignocelluloses) for integrated multi-purpose processing and grows well in marginal lands, in semi-arid and temperate regions, including Africa, India, Latin America and Europe. A limiting factor for its widespread cultivation is the lack of varieties adapted to different growth conditions, including colder climate. Consequently, research should address the optimisation of sweet sorghum as an energy crop through breeding. Besides biomass yield and relevant quality traits, genetic improvement/selection should concentrate on general agronomic traits (such as water and nutrient use efficiency) and, in particular, adaptation of sweet sorghum to colder climates. The project should also address agronomic practices and harvesting technologies leading to improved yield, quality, sustainability and competitiveness of sweet sorghum production. Environmental and economic analysis of sweet sorghum cultivation, including energy balance and life cycle assessment, should also be carried out. International co-operation with third countries leading in biofuel production and energy crops will be an essential added value.

Funding scheme: Small collaborative project

Additional information: SICA. The project is expected to contribute to international co-operation with third countries which are signatories of S&T agreements with the EC from Latin America, South Africa and India. Minimum number of participants: two from two different Member States or Associated Countries plus two from Latin America, one from South Africa and one from India.

Expected impact: Open the market potential of sweet sorghum, which is a potentially cheap feedstock for ethanol, also in the EU. Significant environmental benefits (low water inputs) and good prospects for the development of rural areas.

Partnership

CIRAD: Coordinator +

WP8 and WP4 leader

- ICRISAT (India / WP2 leader)
- KWS SAAT AG (Germany / WP1 leader)
- UNIBO (Italy/WP5 leader)
- ARC-GCI (South Africa)
- WIP (Germany / WP7 leader)
- EMBRAPA (Brazil / WP3 leader)
- IFEU (Germany / WP6 leader)
- UCSC (Italy)
- UANL (Mexico)

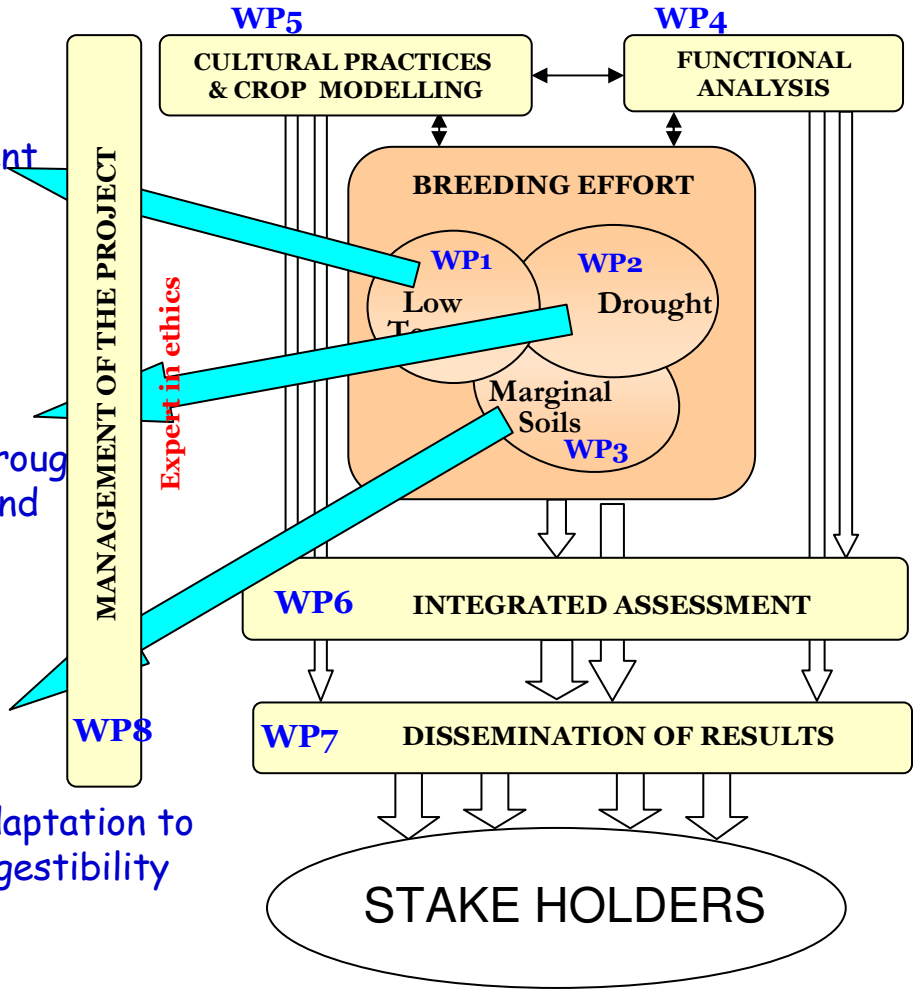
Organisation of WPs

Target ideotyp

Ideotyp 1:
Sorghum with high biomass, good adaptation to low temperature and good digestibility (low content of lignin, *bmr* trait)
⇨ suitable for production of 2nd generation bioethanol

Ideotyp 2:
Double purpose sorghum (grain + sugars) suitable for humane and/or animal feeding, with a good droug adaptation, juicy stalks with high sugar content and good digestibility
⇨ suitable for 1st generation bioethanol

Ideotyp 3:
Double purpose sorghum (grain + sugars) suitable for humane and/or animal feeding, with a good adaptation to marginal soils (acidity, high Al, low P) and good digestibility
⇨ suitable for 1st generation bioethanol



SweetFuel Budget (1)

Participant short name	Estimated eligible costs (whole duration of the project)					Requested EC contribution
	RTD/Innovation (A)	Demonstration (B)	Management (C)	Other (D)	TOTAL A+B+C+D	
CIRAD	1,114,640.00	0.00	320,640.00	124,384.00	1,559,664.00	500,425.00
ICRISAT	464,702.00	20,558.00	15,494.00	17,443.00	518,197.00	382,500.00
EMBRAPA	474,600.00	0.00	12,400.00	17,400.00	504,400.00	380,450.00
KWS	496,320.00	0.00	7,500.00	8,004.00	511,824.00	263,500.00
IFEU	440,516.00	0.00	7,500.00	10,000.00	458,016.00	347,800.00
UNIBO	336,888.00	0.00	7,504.00	8,480.00	352,872.00	268,250.00
UCSC	327,806.00	0.00	7,590.00	0.00	335,396.00	253,250.00
ARC-GCI	242,560.00	0.00	7,520.00	17,120.00	267,200.00	206,375.00
UANL	217,008.00	0.00	7,520.00	17,040.00	241,568.00	187,250.00
WIP	94,500.00	0.00	7,500.00	99,800.00	201,800.00	178,175.00
TOTAL	4,209,540.00	20,558.00	401,168.00	319,671.00	4,950,937.00	2,967,975.00

Objectives

WP1 **WP2** **WP3**

Breed new high-performance sweet sorghum material adapted to:

- temperate area
- drought and/or marginal soil in semi arid tropics

WP4

Improve our knowledge on the accumulation of sugars (trade offs with grain and biomasse production, key enzymes…) and the relationships among traits for sugar accumulation, plant phenology, stay-green and terminal drought tol.

WP5

Understand the agronomic determinants of optimized yield and recommande the best cultural and harvest techniques

Elaborate a plant model for sorghum to identify potential area for production

WP6

Provide a multicriteria evaluation of the sustainability of the bioethanol production from sweet sorghum on a social, economic and environmental point of view

WP7

Promote the exchanges between RTD experts, stakeholders and key actors

Elaborate a detailed exploitation plan

WP8

Identify and monitor evolution of the ethical risks due to the development of ethanol production from sweet sorghum and propose guidelines for policy makers

Information from the GA

Title: Sweet sorghum : an alternative energy crop **Accronyme:** SWEETFUEL

N°: FP7-KBBE-2008-2B - 227422

Date of start: 01/01/2009

10 Beneficiaries: CIRAD / ICRISAT / EMBRAPA / KWS SAAT AG / IFEU / UNIBO / UCSC / ARC-GCI / UANL / WIP

EC contribution: Maximum = 2 967 975 €

Duration: 60 months (12/2013)

4 reporting periods:
From month 1 to month 18
From month 19 to month 36
From month 37 to month 54
From month 55 to the latest month of the project

Deliverables: 91

Special clauses: Mid-term review

Contacts:

EC	CIRAD
SO = Jens HÖGEL	Coordination: Serge BRACONNIER
FO = Daniele SPRINGHETTI	Financial management: Valérie BUISSON
	Emmanuelle REMY

Applicable law: Belgium law


Sweet Fuel
www. sweetfuel-project.eu
Contact: braconnier@cirad.fr