

## Role of participants; objectives, deliverables and expected results for Work Packages

Work package number:	<b>WP1: Agronomy and Land Resources</b>		
Participant number:	3	7	Relative start month <sup>1</sup> : 2
Person-months per participant:	3	3	1Month 0 being the start of the project
<b>Objectives</b> <ul style="list-style-type: none"> <li>Identify the key controllable parameters that affect productivity and yield</li> <li>Design and distribute survey on agricultural performance and resource use</li> <li>Assess potential benefits from integrating complementary crops, e.g. sweet sorghum</li> <li>Characterize and compare the main land resource management schemes</li> <li>Compare availability and scale factors for key resources (water, land, labour)</li> <li>Develop benchmarks for agricultural productivity</li> </ul>			
<b>Description of work /Role of Participants</b> In this work package, a simple methodology will be applied to characterise agronomic conditions and design benchmarks applicable in the region. An industry survey on agricultural performance will provide data. The work package will include a literature review concerning benefits of co-cropping and alternative land resource management schemes.			
<b>Deliverables</b>		<b>Milestones and expected results</b>	
D2: Industry Survey 1		Methodology and status presented at 1st workshop and results presented at 2nd workshop	
D5: Workshop Proceedings 1		Summary of current practices and parameters	
D9: Thematic Report 1: Agriculture		Identification of key features of co-cropping strategies	
		Agricultural performance benchmarks	

Work package number:	<b>WP2: Harvesting and Delivery</b>		
Participant number:	7	3	Relative start month <sup>1</sup> : 3
Person-months per participant:	3	3	1Month 0 being the start of the project.
<b>Objectives</b> <ul style="list-style-type: none"> <li>Overview and comparison of current harvesting, delivery, and transport methods</li> <li>Comparative evaluation of sugarcane burning vs. green cane harvesting options</li> <li>Assess harvesting and delivery issues for co-cropping strategies</li> <li>Identify the key collection, handling, and utilisation issues for cane trash</li> <li>Develop system benchmarks for harvesting and delivery</li> </ul>			
<b>Description of work /Role of participants</b> This WP will review harvesting and delivery methods and identify key issues on co-cropping strategies and handling of burnt vs. green cane. Survey data and literature review used for performance benchmarks.			
<b>Deliverables</b>		<b>Milestones and expected results</b>	
		Methodology and status presented at 1st workshop and results presented at 2nd workshop	
D2: Industry Survey 1		Summary of current practices and parameters	
D5: Workshop Proceedings 1		Comparison of feasible cane trash utilisation strategies	
D9: Thematic Report 1: Agriculture		Cane delivery system performance benchmarks	

Work package number:	<b>WP3: Process Systems Analysis</b>		
Participant number:	5	11	Relative start month <sup>1</sup> : 4
Person-months per participant:	4	2	1 Month 0 being the start of the project.
<b>Objectives</b> <ul style="list-style-type: none"> <li>Design industry survey on factory performance and resource use</li> <li>Identify key issues and choices with respect to juice-fibre separation</li> <li>Characterise cost-effective co-generation plant options and operational tradeoffs</li> <li>Evaluate primary resources and inputs (water, energy, labour, capital)</li> <li>Develop performance benchmarks for integrated system outputs</li> </ul>			

<b>Description of work/Role of participants</b>	
This work package will include comparison of performance characteristics for a typical sugar factory in southern Africa and a state-of-the-art factory, with special attention to steam economy and energy efficiency.	
<b>Deliverables</b>	<b>Milestones and expected results</b>
	Methodology and status at 1st workshop; results at 2nd workshop
D5 Workshop Proceedings 1	Summary of current practices and parameters
D6 Industry survey 2	Guidelines for resource use based on best practice and constraints
D11 thematic Report 2: Industry	Process efficiency evaluation

Work package number:		<b>WP4: Fibre resources</b>	
Participant number:	5	11	Relative start month <sup>1</sup> : 7
Person-months per participant:	4	2	1 Month 0 being the start of the project.
<b>Objectives</b>			
<ul style="list-style-type: none"> <li>• Comparison of existing product options for fibre-based co-products</li> <li>• Development of energy performance benchmarks for co-generation options</li> <li>• Synthesis of relevant cost-efficiency curves for main design alternatives</li> <li>• Develop benchmarks for throughputs, efficiency, labour requirements, etc.</li> </ul>			
<b>Description of work /Role of Participants</b>			
This WP will emphasise bagasse cogeneration and include a brief literature review of alternative uses of bagasse. A benchmarking comparison of cogeneration plants inside and outside the region will be used.			
<b>Deliverables</b>	<b>Milestones and expected results</b>		
D5 Workshop Proceedings 1	Identification of primary bagasse utilisation options for sugar factories in southern Africa		
D11 Thematic Report 2: Industry	Literature review summarising co-generation plant options		
	Development of performance benchmarks		

Work package number:		<b>WP5: Sugar resources</b>	
Participant number:	2	12	Relative start month <sup>1</sup> : 8
Person-months per participant:	3	3	1 Month 0 being the start of the project.
<b>Objectives</b>			
<ul style="list-style-type: none"> <li>• Scale and cost comparisons for alternative distillery configurations</li> <li>• Comparison of alternative feedstocks for ethanol production</li> <li>• Outline options for stillage disposal &amp; biogas generation</li> <li>• Identify major industrial co-product opportunities</li> <li>• Develop benchmarks for throughputs, efficiency, labour requirements, etc.</li> </ul>			
<b>Description of work /Role of Participants</b>			
This work package will emphasise ethanol production options, but will also include a literature review on other uses of the sugar resource stream. A brief review of experiences with stillage disposal from industry survey; Resource utilisation benchmarks for energy and water consumption.			
<b>Deliverables</b>	<b>Milestones and expected results</b>		
D5 Workshop Proceedings 1	Identify primary utilisation options for sugar resource stream, including cane juice, molasses, and raw sugar.		
D11 Thematic Report 2: Industry	Evaluate ethanol feedstock options, scale factors for production		
	Literature review regarding main stillage disposal options		
	Evaluation of resource requirements, optimal plant configuration		

Work package number:	<b>WP6: Policies and Regulations</b>						
Participant number:	8	1	13	14	Relative start month <sup>1</sup> :	9	
Person-months per participant:	3	1	1	1	1 Month 0 being the start of the project.		
<b>Objectives</b>							
<ul style="list-style-type: none"> <li>• Sketch current status and future scenarios for preferential sugar markets and quotas</li> <li>• Provide an overview of existing and potential regional co-product markets</li> <li>• Overview of national regulations and policies</li> <li>• Analysis of international markets and opportunities</li> </ul>							
<b>Description of work /Role of Participants</b>							
This work package will benefit from interviews with stakeholders and policy-makers conducted in conjunction with workshops and study visits. The project team will synthesise interviews and fieldwork into an overview of policy and regulatory environment for bio-fuels (ethanol) and bio-electricity (cogeneration).							
<b>Deliverables</b>				<b>Milestones and expected results</b>			
D8 Workshop Proceedings 2				Summary of sugar quotas and preferential markets for the region			
D12 Thematic Report 3: Markets				Overview of regulatory environment for independent power producer			
				Summary of taxes and regulatory structure for gasoline and diesel			
				Identification of major regional and international markets			

Work package number:	<b>WP7: Trade, Financing, and Investment</b>						
Participant number:	8	11	13	14	Relative start month <sup>1</sup> :	10	
Person-months per participant:	3	1	1	1	1 Month 0 being the start of the project.		
<b>Objectives</b>							
<ul style="list-style-type: none"> <li>• Characterise the main relevant trade agreements and regulations</li> <li>• Identify main sources of project financing and compare their advantages</li> <li>• Sketch the role of major international partners and funding channels (e.g. CDM)</li> <li>• Compare alternative co-product strategies from an investment perspective</li> </ul>							
<b>Description of work /Role of Participants</b>							
This work package will examine how trade policies affect co-product alternatives and identify opportunities for financing through international or regional channels. Special attention will be given to placing sugarcane bio-energy projects within the framework of climate change mitigation efforts (e.g. CDM).							
<b>Deliverables</b>				<b>Milestones and expected results</b>			
D8 Workshop Proceedings 2				Identify major trade barriers, opportunities for cane co-products			
D13 Thematic Report 3: Markets				Overview of major sources of funding and international support			
				Screening of major co-product options for financial viability			

Work package number:	<b>WP8: Implementation and Strategies</b>						
Participant number:	8	1	13	14	Relative start month <sup>1</sup> :	12	
Person-months per participant:	3	1	1	1	1 Month 0 being the start of the project.		
<b>Objectives</b>							
<ul style="list-style-type: none"> <li>• Characterise major co-product strategies relevant to regional markets</li> <li>• Identify key market barriers to co-product strategies</li> <li>• Assess status and linkages for product distribution and transportation channels</li> <li>• Identify major nodes in a potential co-ordination network for regional flow of final and intermediate goods and assess major strengths and weaknesses in this network</li> </ul>							
<b>Description of work /Role of participants</b>							
This work package characterises co-product strategies in terms of feasibility and supporting policies and financing for implementation. Product distribution is considered and a regional co-ordination network is postulated as a means of reducing transportation costs and expanding trading							

opportunities. The strategies identified in this work package provide the structure for comparisons of impacts and risks.

<b>Deliverables</b>	<b>Milestones and expected results</b>
D8 Workshop Proceedings 2	Rough sketch of a regional transportation network
D13 Thematic Report 3: Markets	Identify market barriers to co-products in the region
	Define a basic set of strategies to structure comparisons of impacts, risks, and sustainability

Work package number:	<b>WP9: Socio-economic Impacts</b>				
Participant number:	6	2	4	Relative start month <sup>1</sup> :	13
Person-months per participant:	4	1	1	<small><sup>1</sup> Month 0 being the start of the project.</small>	
<b>Objectives</b>					
<ul style="list-style-type: none"> <li>Identify primary and secondary socio-economic impacts</li> <li>Develop a matrix of co-product strategies and their major socio-economic impacts</li> <li>Compare socio-economic impacts for existing system/technology configurations in the region with best-practice and/or cost-effective system/technology options</li> <li>Assess gender impacts of changes in production and utilisation of cane resources</li> </ul>					
<b>Description of work /Role of participants</b>					
The socio-economic impacts work package will identify the major impacts and show how these impacts change across different strategies. Exchanges and study visits to local communities and interviews with residents and small business owners will provide background. The effect of changing technologies will be illustrated for expanded production and shifts in production (towards co-products and away from sugar).					
<b>Deliverables</b>	<b>Milestones and expected results</b>				
D8 Workshop Proceedings 2	Identification of primary socio-economic impacts				
D14 Thematic Report 4: Impacts	Comparison of impacts across different co-product strategies				
	Illustrate gender impacts resulting from cane resource strategies				

Work package number:	<b>WP10: Environmental Impacts</b>					
Participant number:	2	4	6	12	Relative start month <sup>1</sup> :	14
Person-months per participant:	3	1	1	1	<small><sup>1</sup> Month 0 being the start of the project</small>	
<b>Objectives</b>						
<ul style="list-style-type: none"> <li>Identify the major environmental impacts of alternative co-product strategies</li> <li>Assess local, national, regional, global environmental consequences of changes in cane resource use</li> <li>Compare impacts for existing and best-practice system/technology configurations in the region</li> <li>Provide an estimate of CO2 reduction-potential for regional co-product scenarios</li> </ul>						
<b>Description of work /Role of participants</b>						
The environmental impacts work package will identify the major impacts and show how these impacts change across different strategies. Exchanges, study visits, and interviews with stakeholders at the national regional, and local level will be conducted. The effect of changing technologies will be illustrated for expanded production and shifts in production (towards co-products and away from sugar).						
<b>Deliverables</b>	<b>Milestones and expected results</b>					
D8 Workshop Proceedings 2	Identification of primary socio-economic impacts					
D14 Thematic Report 4: Impacts	Comparison of impacts across different co-product strategies					
	Environmental impact matrix for technology/resource changes					

Work package number:	<b>WP11: Risk Analysis and Global Competitiveness</b>				
Participant number:	1	8		Relative start month <sup>1</sup> :	16

Person-months per participant:	5	1			<sup>1</sup> Month 0 being the start of the project
<b>Objectives</b>					
<ul style="list-style-type: none"> <li>Design a simple tool to demonstrate the role of cane co-products as a risk reduction strategy</li> <li>Apply this tool for key regional parameters and scenarios</li> <li>Assess the contribution of cane co-product strategies to improved global competitiveness for the regional sugar industry and its affiliated industries</li> </ul>					
<b>Description of work /Role of participants</b>					
This work package analyses results of the implementation and strategies work package from the perspective of risk and global competitiveness. A simple mathematical tool will be developed and applied to show how co-product strategies can reduce financial risks through product diversification. Using the results of the industry survey, a few representative cases will be chosen to which to apply the framework.					
<b>Deliverables</b>			<b>Milestones and expected results</b>		
D12: Workshop Proceedings 3			Develop a simple analytical tool to illustrate the risk impacts of cane co-product strategies		
D15: Thematic Report 5: Synthesis/Integration			Apply the risk analysis tool to representative cases in the region		
			Outline the expected impacts on competitiveness for the sugar industry in the region		

Work package number:	<b>WP12: Contributions to Sustainable Development</b>				
Participant number:	4	6		Relative start month <sup>1</sup> :	17
Person-months per participant:	4	2		<sup>1</sup> Month 0 being the start of the project	
<b>Objectives</b>					
<ul style="list-style-type: none"> <li>Illustrate how cane co-products address sustainability issues</li> <li>Develop benchmarks for regional development goals</li> <li>Show how cane co-products link to basic energy and development goals in southern Africa</li> </ul>					
<b>Description of work /Role of participants</b>					
This work package integrates results to provide a general picture of how cane resources can contribute to sustainable development. Sustainability criteria will draw especially on the socio-economic and environmental impacts, and will demonstrate key linkages to energy and development goals for the region.					
<b>Deliverables</b>			<b>Milestones and expected results</b>		
D12: Workshop Proceedings 3			Define sustainability criteria for cane resource utilisation		
D15: Thematic Report 5: Synthesis/Integration			Develop indicators for contributions to regional development goals		
			Estimate of long-term substitution potential of cane resources for fossil fuels		

Work package number:	<b>WP13: Co-ordination (SEI)</b>				
Participant number:	1			Relative start month <sup>1</sup> :	1
Person-months per participant:	6			<sup>1</sup> Month 0 being the start of the project	
<b>Objectives</b>					
<ul style="list-style-type: none"> <li>Co-ordinate the work of partners and members</li> <li>Synthesise and edit project reports and documentation</li> <li>Management of Meetings &amp; Exchanges</li> </ul>					
<b>Description of work</b>					
The co-ordination tasks are ongoing throughout the project, and include editing and distribution of reports, chairmanship of meetings, and organisation of exchanges. Workshop planning and editing of proceedings will be delegated to different partners according to the different emphases of the three workshops.					
<b>Deliverables</b>			<b>Milestones and expected results</b>		
D1, D4: Exchange reports			Annual reports edited and distributed		
D3, D7, D10: Annual reports			Exchange visits approved, carried out, and reports written		

	Database of contacts developed and maintained
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Work package number:	<b>WP14: Dissemination</b>				
Participant number:	1	2		Relative start month <sup>1</sup> :	1
Person-months per participant:	2	2.5		<small><sup>1</sup> Month 0 being the start of the project.</small>	
<b>Objectives</b>					
<ul style="list-style-type: none"> <li>Develop a plan for dissemination, including a website, electronic newsletter, and contact database</li> </ul>					
<b>Description of work/Role of participants</b>					
The dissemination tasks include a website, and electronic newsletter, and creation of a contact database for individuals and organisations working in the area of sugarcane resources. It also includes creating a contact database that will be used for dissemination/distribution of published reports and workshop proceedings.					
<b>Deliverables</b>			<b>Milestones and expected results</b>		
D17	Newsletter (electronic)		Electronic newsletter published bi-annually		
D18	Website (updates)		Website updated bi-annually		

## 1 Training and exchanges of scientists

The network will bring together diverse actors through exchanges or study visits. The exchanges will last approximately 2 weeks each and will be designed so that an industrialised and developing country partner interact during this period. Exchanges or study visits will expose the partners to the conditions “on-the-ground” in southern Africa with respect to the particular area of focus for each participant. Developing country partners will have the option of visiting European facilities of a relevant nature or choosing a third developing country location outside the region, which may be more advanced in technology or management with respect to cane co-products and resources. Exchanges will be co-ordinated (requiring approval of the co-ordinator) across the project team so as to insure complementarity and avoid replication. For the agricultural phase, this will undoubtedly include visits to several cane estates and or small-grower plots. For the industrial phase; there will be visits to sugar factories, ethanol distilleries and related facilities. The study visits for the markets phase and the impacts phase will be somewhat more methodological in nature, including interviews with stakeholders and visits to residents and small businesses in affected villages and towns.

## 2 Dissemination Activities

Dissemination activities are designed to bring the benefits of the network to as many relevant stakeholders as possible, both in the region and in partner countries in Europe and elsewhere. The activities will include:

- publication of the workshop proceedings and thematic reports
- an Internet Website, updated bi-annually
- bi-annual electronic newsletter with contributions from project participants
- creation of a contact database to be used for dissemination of reports and workshop proceedings
- continuous exchange of ideas and feedback within the network and with all interested parties
- presentations at the Congresses of the International Society of Sugar Cane Technologists (ISSCT)

The ISSCT Congresses offer a very timely opportunity for global dissemination of the network objectives and results. The ISSCT has thousands of members and is the only organisation focusing exclusively on sugar cane. It also has a higher developing country profile than any comparable international organisation. The Congresses are held every 3-4 years and this coincides well with the timeframe of CARENSA. There will be an ISSCT

Congress in Australia in September 2001, which will allow a presentation on the objectives of CARENSA and the solicitation of ideas and contributions. The following Congress will be held in January 2005, at which time CARENSA will be in its final phase, and therefore offers an excellent opportunity to present results from the project.