

University-industry interaction on cleaner production

The case of the cleaner production center at the University of Cienfuegos (Cuba)

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Aim

- » 1. **Master degree** on cleaner production at the University of Cienfuegos (UCf)
- » 2. **Cleaner Production Center** (CPC) at the UCf
- » 3. Interuniversity **collaboration**

Outline

- » 1. Context
- » 2. Master degree
- » 3. Cleaner Production Center
- » 4. Conclusions

CP context

- » 1. Sustainable development
- » 2. Circular/efficient use of **inputs**; limit **pollution**
- » 3. Improve **environmental performance** and **competitiveness**

University context

- » 1. **Training**: master, Ph. D
- » 2. **Research**: Supporting training and services/consultancy
- » 3. **Social responsibility**: Example role (e.g. on environment/SD); inking up the university with industry, SMEs, and service sector

CPC context

- » 1. Supporting the **CP implementation** in the production and service sector
- » 2. **Cultural, economic, regulatory** differences (international, regional, local)

Cuban context

- » 1. General **legal basis** (1997) “Preventing negative impacts on the environment”
- » 2. National **environmental strategy on CP** since 2000s; limited results
- » 3. National **Cleaner Production Network** (UNIDO-UNEP) since 2001

Barriers implementing CP in developing countries

- » 1. Environmental **awareness and culture**
- » 2. Trained and equipped **staff** – capacity
- » 3. **International** networking

University of Cienfuegos (UCf)

- » 1. 4000 **students**; 450 academic **staff**
- » 2. **Faculties** of **engineering**, agro-sciences, economics and management, social sciences, humanities
- » 3. **Provincial** priority issues mission

Province of Cienfuegos (Cf)

- » 1. **Southern-Central** Cuba
- » 2. 150,000 inhabitants in a **WHS**
- » 3. **Pollution** originates from agriculture, industry, tourism, households
- » 4. Particular concern:
fast degrading **bay water quality**



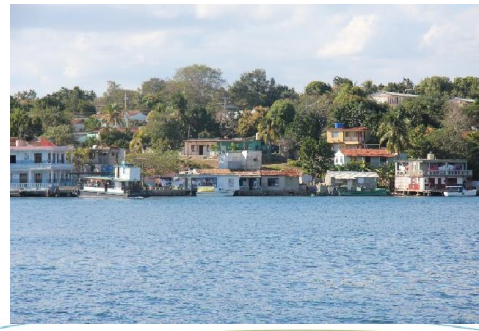
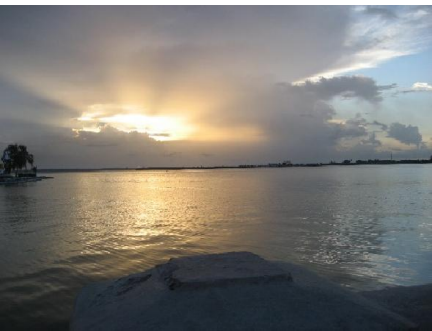
Need for CP in Cf

- » 1. Focus on **energy**, water, waste, **EMS**
- » 2. By 2007 Cienfuegos did **not deal** with CP
- » 3. **Stakeholder** questionnaire revealed the **need** for research, guiding industry and consultancy on CP
- » 4. **Pilot** projects showed significant results could be reached



Specific context of CP in Cf

- » 1. Cuban companies are **state owned**; limited and regulated market participation opportunities
- » 2. UCf does **not** undertake **commercial** activities
- » 3. **Province** targeted **issues**: Local industry/SMEs; pollution of the bay; SD of the city and the province



UCf reply to this context

- » 1. Master degree on CP
- » 2. Supporting research
- » 3. Center of CP
- » 4. International cooperation

Master in Cleaner Production at UCf

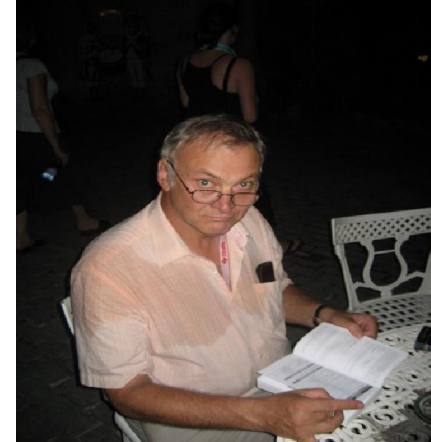
- » 1. Target audience: **Professional managers** of CP in their organization
- » 2. **Interdisciplinary** concept: environment/SD, engineering economic, social aspects
- » 3. **Structure**: 4 modules/12 courses and a thesis
- » 4. **Quality management**
 - * Internal
 - * Accredited by the competent Cuban authorities

Master degree promotions

Promotion	Dates		Students	Theses defended	Thesis in progress
	Starting	Concluding			
1	September 2009	February 2012	21	16	0
2	September 2011	February 2014	24	16	3
3	January 2013	July 2015	24	0	15
4	January 2015	July 2017	48	0	0

Inter-university collaboration on master program

- » 1. In complement to Cuban contributions, transposing **courses** from Europe to UCf: Waste management, water treatment, SD, (instruments for) environmental management
- » 2. Interactive/involving **training approaches**: Discussions, workshops, student assignments
- » 3. **Staff exchange**, Ph. D training, publications



CP Center at the Ucf (since 2008)

- » 1. Aim: Protagonist on **implementing CP** (industry, service sector)
- » 2. Approach: Focus on **environmental** quality and **energy**
- » 3. **Research** projects on CP
 - * Thesis support
 - * Priority: Main pollution activities
- » 4. **Workshops**



Inter-university collaboration on CPC activities

- » 1. Advice and co-guidance **master and Ph. D research**
- » 2. **Research lines:**
 - * Inventory of pollution sources and emissions in Cf
 - * Energy valorization of biomass
 - * Sustainability indicators for Cf
- » 3. Participation in **workshops**
- » 4. **Project management**

Conclusion (1/2)

- » 1. Master thesis projects result in **measurable improvement** of pollution and its effects
- » 2. **Synergism** between master program and the CPC on
 - * Bridging university and societal stakeholders
 - * Improving environmental quality
 - * Guidance on SD

Conclusion (2/2)

- » 3. North-South cooperation on:
 - * Capacity building and expertise transfer
 - * Internships
 - * Publications
- » 4. Prospects
 - * Inter-university Ph. D program