



**ICAO AVIATION AND SUSTAINABLE
ALTERNATIVE FUELS
WORKSHOP**



ICAO Headquarters, Montréal, Canada

18 to 20 October 2011

The Romanian Camelina Value Chain: Case study on Land Use Change

Presented by:

Dr Delia Dimitriu (Manchester Metropolitan University)

Frédéric Eychenne (AIRBUS)



ICAO AVIATION AND
SUSTAINABLE
ALTERNATIVE FUELS

WORKSHOP

AGENDA



- AIRBUS role & strategy
- Camelina Value Chain Objectives & Roadmap
- Sustainability aspects
- Land use change: The approach
 - Demo trials
 - Assessment
 - Contaminated Land
- Perspectives for Romania and EU
 - Agriculture
 - Industry – Economy - Energy
- The European BioFuels Flightpath



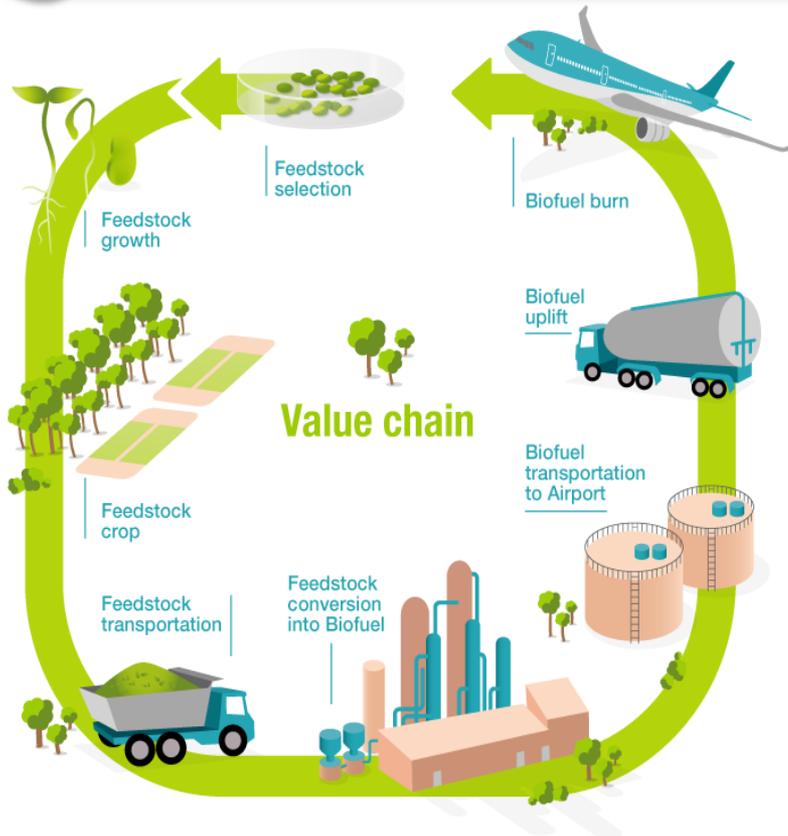
ICAO AVIATION AND SUSTAINABLE ALTERNATIVE FUELS

WORKSHOP

AIRBUS acts as a catalyst for commercialization of BioFuels



1 Guarantee the sustainability of the solution



2 Set-up one Value Chain Project on each continent



- Biofuel Implementation
- Qatari Solution
- Microalgae**



- Biofuel Implementation
- Romanian solution
- Camelina**



- Biofuel Implementation
- Spanish solution
- Camelina**



- Biofuel Implementation
- Brazilian solution
- Jatropa**

Prepare and push for commercialization of Bio-Jet Fuels



ICAO AVIATION AND SUSTAINABLE ALTERNATIVE FUELS

WORKSHOP

The Camelina Value Chain objectives



- Stakeholders: TAROM, Airbus, Camelina Company España, UOP
- Feedstock: Camelina Sativa
- Objectives:
 - Develop a sustainable biofuel supply chain capable of producing 100 000 tonnes of Camelina Biofuel in the coming years (objective = 2015)
 - Strengthen the project in order to link it with the European Advanced Biofuels Flightpath (2M tons of biofuels to be produced in Europe by 2020)
- Sustainability Assessment and LCA studies conducted by **Manchester Metropolitan University**
- **TAROM Biofuel Flight is planned** in the first half of 2012
- Biofuel refinery development in progress in partnership with UOP and a Romanian local refinery





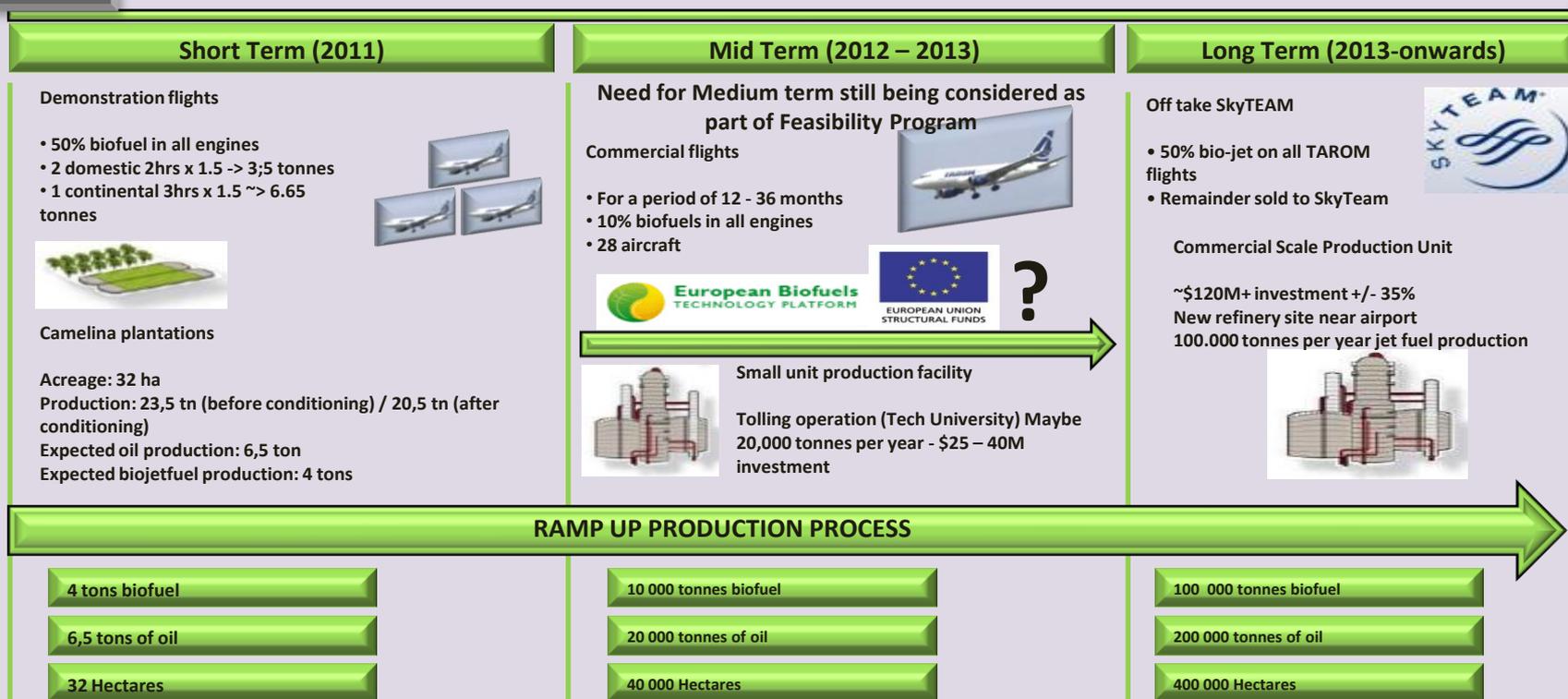
ICAO AVIATION AND SUSTAINABLE ALTERNATIVE FUELS

WORKSHOP

The Camelina Value Chain roadmap



Initial Plan



TAROM 2009 Fossil Jet Fuel Usage ~ 100,000 tonnes

Current situation

Camelina Harvested → July 2011

Done

BioFuel production → Q1 2012

Demo Flights → 2012



ICAO AVIATION AND SUSTAINABLE ALTERNATIVE FUELS

WORKSHOP

Sustainability aspects



MANAGEMENT & COORDINATION



AGRICULTURAL DEVELOPMENT



TECHNOLOGICAL DEVELOPMENT



AERONAUTICAL DEVELOPMENT

camelina company
España



SUSTAINABILITY ASSESSMENT



COMOTI
NATIONAL RESEARCH & DEVELOPMENT INSTITUTE FOR GAS TURBINES

RSB

- Life Cycle Analysis
- RED/RSB sustainable analysis
- Environmental impact
- Cost/Benefit analysis



ICAO AVIATION AND SUSTAINABLE ALTERNATIVE FUELS

WORKSHOP

Camelina Placement Trials

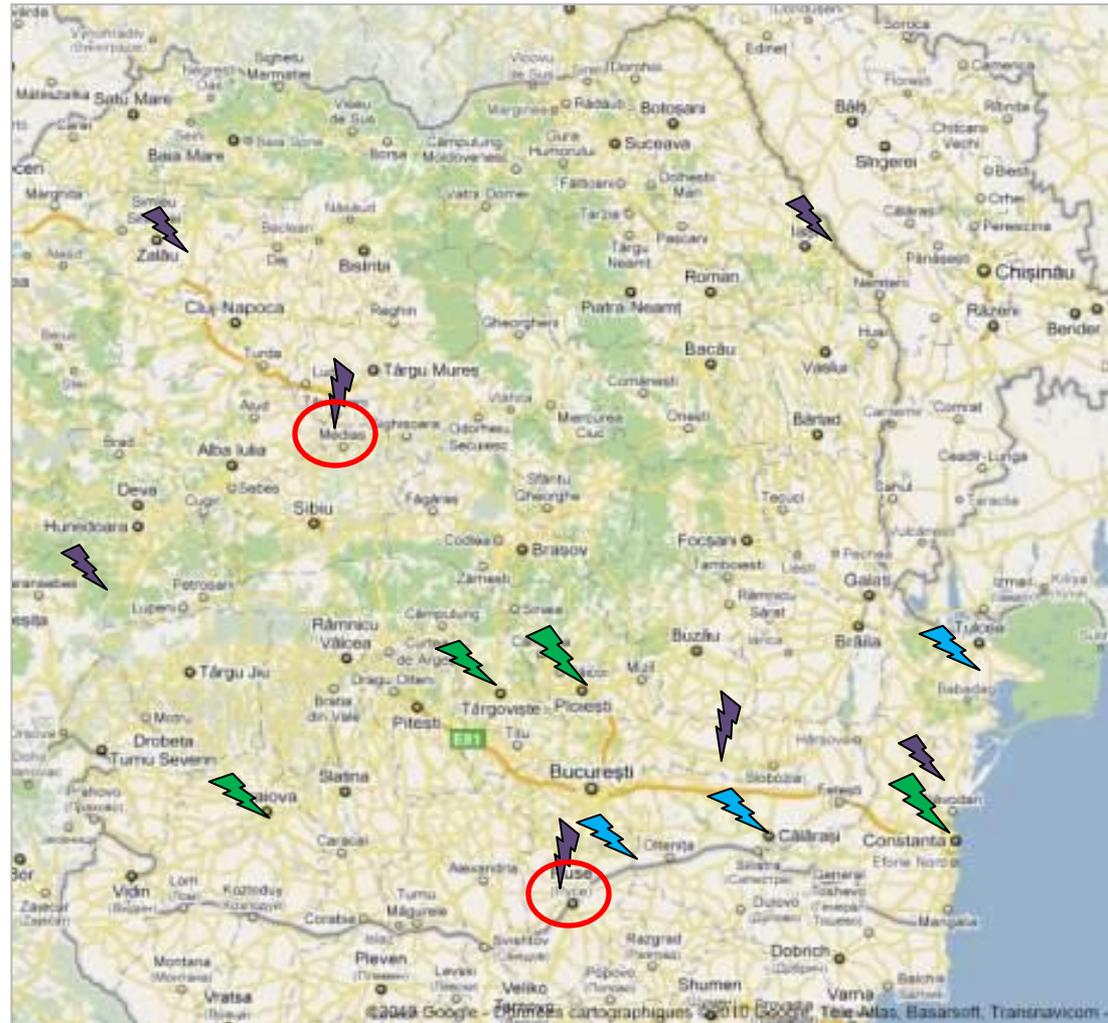


TAROM/ locations autumn trails:
Tulcea, Calarasi

BIOECA locations spring trials:
Dambovita, Constanta, Dolj, Ialomita

TAROM/locations spring trials:
Cluj, Iasi, Calarasi

Farmer entity	County	Surface seeded (Ha)
SC. Agrozootehnica S.A., MIHAILESTI	GIURGIU	3 Ha
Copsa Mica	SIBIU	0.05 Ha





ICAO AVIATION AND SUSTAINABLE ALTERNATIVE FUELS

WORKSHOP

Mihailesti Trial from seeding to oil



3 varieties / 2 periods for sowing → Austria-Calena ; Germania-GP 202; Romania-Camelia



Nov 2010



May 2011



Jun 2011



Jun 2011



Jul 2011



Jul 2011



Jul 2011



Jul 2011



ICAO AVIATION AND SUSTAINABLE ALTERNATIVE FUELS

WORKSHOP

Land Use Change assessment wrt. Sustainability Criteria



- Objective is to assess historical land-use (2007- 2011) and prepare land destination for 2012 according to sustainability criteria.
- Example of Questionnaire distributed to farmers to collect the data:

Crop lands	Forestry and woodland, including orchards	Inundated land	Irrigated land	Abandoned land	Marginal land	Land Regeneration & urban greening	Other polluted	Involved in another project trial
17 ha	-	~4	2 ha	4 ha	3ha	-	0.5ha	1.5 ha

*Figures related to all demo trials.

1. Romania has 3,2 M Ha of uncultivated land / 800 000 Ha of polluted land.
2. Objective is to support Romanian Government Policy on Land Use based on Sustainability criterias
3. A working Group (AIRBUS-TAROM + Romanian Government) has been setup to develop a clear policy on land use



Copsa Mica: 0.5 ha camelina

- Copsa Mica was one of Europe's most Polluted area (smokes, contaminated land & water, ...):
 - Carbosin that produced carbon shut down in 1993
 - but Sometra, a non-ferrous metallurgical smelter still operating.



Research:

- Trial dedicated to investigation on metal traceability from soil to plant, seed & oil (i.e focus on vanadium)
- A dedicated research team is already in place (MMU).
- The main Research topics and targets are:
 - Develop a **process** to collect data, measure results and propose corrective actions
 - Design a **Quality assurance system** for the entire Value Chain



- The BioFuels production aims to offer many advantages for the Romanian agriculture development but the sector needs to:
 - Implement a programme to support Camelina growers (i.e. Incentives, ...)
 - Coordinate this programme with all ministries involved in the Camelina Value Chain in order to make it profitable and sustainable for Romania
 - Create Regional “Centres of Competence” for Camelina growers including association of farmers and distributors
 - Develop a policy for commercialisation of Camelina side-products (i.e. cake as animal feed)
 - Involve neighbouring countries: Prepare cultivation Polish Camelina (Przybrodzka II) in Romania in spring 2012



- New type of market is synonym of economical development and growth:
 - New jobs and revenues for farmers
 - New production areas for existing refineries and transformation facilities
 - New context for internal or external investors
- New perspectives for efficient use of existing capabilities in Romania
 - Use uncultivated land and marginal land. Crop rotation opportunity.
 - Efficient use of available refineries
 - Development of a new model of self-sustained / energy farms
- Improve Energy security based on sustainable and renewable energy sources
- This project is an initiative preparing the EU strategy for BioFuels (European BioFuels FlightPath) → Produce 2M Tons of Biofuels in 2020



**ICAO AVIATION AND
SUSTAINABLE
ALTERNATIVE FUELS**

WORKSHOP



Thank you