



# **CORE-JetFuel**

**Coordinating research and innovation in the field of sustainable alternative fuels for Aviation**

**Coordination and support action - FP7 - 605716**

**Stakeholder Working Group 1  
Feedstock and Sustainability**

**Minutes**

**Stakeholder Telephone conference  
25 March 2014 15:00 – 17:00**



## **Background - The CORE-JetFuel Project**

### **Objectives**

The CORE-JetFuel project supports the European Commission in its dynamic and informed implementation of research and innovation projects in the field of sustainable alternative fuels for aviation. It links initiatives and projects at the EU and Member State level, serving as a focal point in this area to all public and private stakeholders. CORE-JetFuel addresses competent authorities, research institutions, feedstock and fuel producers, distributors, aircraft and engine manufacturers, airlines and NGOs. The project is aimed to set up a European network of excellence for alternative fuels in aviation that brings together technical expertise from all across this complex thematic field and helps to coordinate R&D as well as implementation efforts.

More information can be found on the CORE-JetFuel official website: [www.core-jetfuel.eu](http://www.core-jetfuel.eu)

### **Stakeholder involvement**

CORE-JetFuel will ensure cooperation with other European, international and national initiatives and with the key stakeholders in the field. The expected benefits are enhanced knowledge of decision makers, support for maintaining coherent research policies and the promotion of a better understanding of future investments in aviation fuel research and innovation.

In order to ensure efficient involvement of international experts and stakeholders in the coordination of research and innovation throughout the duration of the project, four stakeholder working groups are established on the following topics.

- WG1: Feedstock and sustainability
- WG2: Radical concepts and conversion technologies
- WG3: Technical compatibility, certification and deployment
- WG4: Policies, incentives and regulation

### **CORE-JetFuel Working Group 1 – Feedstock and Sustainability**

For a number of ecologic and economic reasons, the aviation industry is in great need for alternative fuels. Highly ambitious goals for the reduction of the sector's overall greenhouse gas emissions set from industry and politics imply sustainable alternative fuels as major contribution. To meet the high expectations research and innovation efforts are required in order to develop pathways for an economically feasible large-scale production of such fuels for aviation.

The transformation of its energy base from fossil fuels to a secure supply of renewable, climate-friendly, sustainable and sufficiently scalable alternative fuels represents a tremendous challenge for aviation. Many different types of renewable feedstock, most prominent biogenic materials (biomass), and various kinds of conversion technologies can be utilised for the production of alternative jet fuel.

## First WG1 Telephone Conference – Timing, Organization, Participants

**Telephone Conference Timing: 25 March 2014, 15:00 – 17:00 (CET)**

### ***Telephone Conference Organization:***

FNR (Contact – CORE-JetFuel Working Group 1)  
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WIP Renewable Energies (Contact - CORE-JetFuel Stakeholder Involvement)  
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### ***Participants***

Chris Malins	International Council on Clean Transportation (ICCT), UK
Daniela Thrän	Deutsches Biomasseforschungszentrum (DBFZ), Germany
Donald Smith	McGill University / BioFuelNet, Canada
Inmaculada Gomez Jimenez	SENASA / ITAKA Project, Spain
Jamie Stephen	BioFuelNet, Canada
Jenny Walther-Thoss	WWF Germany
Karlheinz Haag	Deutsche Lufthansa (DLH), Germany
Rocio A. Diaz-Chavez	Imperial College London, UK
Sergio Ugarte	SQ Consult, The Netherlands
Yuri Herreras Yambanis	Camelina Company España, Spain

#### CORE-JetFuel Consortium:

Johannes Michel Vincent Pelikan	Fachagentur Nachwachsende Rohstoffe e.V. (FNR), Germany
Rainer Janssen Dominik Rutz	WIP Renewable Energies, Germany
Arne Roth Christoph Jeßberger	Bauhaus Luftfahrt e.V. (BHL), Germany
María de la Rica Jimenéz	SENASA, Spain

### **Objective**

The first CORE-JetFuel telephone conference of Working Group 1 set out to discuss key issues and challenges of feedstock production for alternative jet fuels and their overall sustainability performance. The conference call was structured by a set of guiding questions provided to all participants prior to the telephone conference (see Appendix I).

### **Summary**

The conference call was opened by Johannes Michel (FNR) with a brief presentation of the project's main goals and objectives, highlighting the importance of the four stakeholder working groups for CORE-JetFuel and its outcomes. Rainer Janssen (WIP) gave an overview on the involvement of experts and stakeholders in the project.

The participants were invited to introduce themselves and the institution they are representing before answering the first question, which addressed the concept of indirect land use change (ILUC) and its importance for the overall Greenhouse Gas (GHG) balance of alternative jet fuels. The second part of the question addressed recommendations to the European Commission for tackling the uncertainties surrounding ILUC.

Although Daniela Thrän (DBFZ) considers ILUC an important and scientifically sound concept, she underlined the difficulty to use ILUC as policy instrument. The main shortcoming of the ILUC concept thereby concerns its applicability, as operators and investors are generally not in a position to address ILUC. Furthermore, the current uncertainty surrounding ILUC as a concept is negatively affecting potential investments.

Conclusively, Ms. Thrän stated that assigning ILUC factors will not be a sufficient measure to solve land use problems connected with the production of biomass. The European Union should focus on direct measures to ensure sustainable land use. Furthermore, it may be advisable to provide only incentives for slow and gradual increases of biofuel quantities. With respect to ensuring the overall sustainability of biomass based alternative fuels, Ms. Thrän recommended the following policy measures:

- Agreement on moderate and stable long-term targets for biofuels (to facilitate investment security while avoiding large unintended negative impacts)
- Long-term perspectives with respect to feedstock and technology
- Detailed monitoring of the biofuels sector
- Sharpen quality standards

- Facilitate the technical shift from 1<sup>st</sup> to 2<sup>nd</sup> generation biofuels

Chris Malins (ICCT) highlighted that ILUC is a significant source of GHG emissions and therefore very important in the assessment of the overall sustainability of biofuels. For this reason, he recommended a regulatory treatment of ILUC.

With respect to the use of ILUC factors Mr. Malins stated that investors are able to respond to a regulatory approach to ILUC. As an example he mentioned California's Low Carbon Fuel Standard which already treats ILUC in a regulatory way using ILUC factors.

For the revision of the European Renewable Energy Directive (RED) Mr. Malins recommended the approach taken by the California Low Carbon Fuel Standard to address the issue of indirect land use change:

- Integrate ILUC factors in the "revised" RED (addressing transport biofuels for all applications including the aviation sector)
- Introduce ILUC factors for selected feedstock
- Introduce performance standards (i.e. link regulatory support with GHG emission performance of biofuels)

Jenny Walther-Thoss (WWF Germany) agrees with the important impact of ILUC with respect to the sustainability of biofuels. Nevertheless, she sees the need to further develop the methodology by applying it on different levels, reaching from the regional feedstock level to the project level.

In order to promote biofuels with low ILUC risk, WWF is currently engaged in the development of the Low Indirect Impact Biofuels (LIIB) methodology in cooperation with Ecofys and EPFL. This methodology may be used as add-on to existing sustainability standards to certify biofuels with low ILUC risk and thus serve to enhance the applicability of the ILUC concept for operators and investors.

Jamie Stephens (BioFuelNet) regards the clarity and consistency of rules imposed by policies and regulations as a crucial issue to generate investment security. Investors and operators in the biofuel value chain (including the aviation sector) will need to rely on stable frameworks without being directly involved in scientific methodologies for the calculation of ILUC impacts.

Karlheinz Haag (DLH) also highlighted the importance of land use change as a consequence of feedstock production. The pressure energy crop cultivation poses on agricultural land may further increase the competition between food and feedstock production. He criticized the high uncertainty of the EU approach to ILUC and questioned the appropriateness of the concept in general. In his opinion, the focus should be placed on sustainable land use and not on the end product.

The approach Karlheinz Haag was recommending is to define explicit sustainability criteria and apply them step by step on project level. He stated that the ILUC concept does not help investment in biomass based alternative aviation fuels from the airline's perspective. The necessary clear framework conditions are currently not in place due to the high degree of uncertainty of the ILUC concept.

Yuri Herreras Yambanis (Camelina Company España) stated that the inclusion of ILUC factors in the production of camelina-based fuel will be connected with high costs, which the biofuel industry is not willing to pay and might not be able to afford. ILUC factors should be defined on a case by case basis (since it can change significantly between regions for the same crop - varying from sustainable to unsustainable) instead of applying general ILUC. He

also recommended a project-based approach coupled with the promotion of R&D and demonstration activities.

Inmaculada Gomez Jimenez (SENASA) stated that due to the high degree of generalization the application of ILUC factors should be avoided. In combination with the high variability regarding the applicability of different (ILUC) methodologies, the implementation of indirect land use change factors in a regulatory way is far from maturity. Rather, a project / local approach coupled with a focus on R&D activities should be pursued in her view. A key issue to the deployment of alternative jet fuels is in Ms. Gomez Jimenez' opinion the harmonization and mutual recognition of sustainability standards, which creates a 'level playing field' in the global sector that is aviation.

A preliminary conclusion from the discussion outlined above is that ILUC is an important concept impacting the overall sustainability of alternative (jet) fuels in terms of GHG emissions. Due to the current concern in regard to applicability and clarity of the concept, the European Commission should focus on safeguarding sustainable land use in general as well as conducting further research on ILUC factors of specific types of feedstock on a project level.

Especially in the aviation sector consideration should be given to the (emotional) public discussion about biofuel induced land use change.

The subsequent discussion addressed the European Advanced Biofuels Initiative (FPI) and the feasibility of achieving an annual production of two million tons of sustainable alternative fuel for aviation.

Although the participants of the conference call generally regarded the FPI to be useful, they strongly questioned the feasibility of its main target. A major stepping stone in this regard seemed to be the economic feasibility as well as technological maturity gates.

Crucial for moving towards the achievement of the FPI target is the inclusion of all important stakeholders of the value chain (e.g. feedstock providers, engine manufacturers, airlines).

With respect to the guiding question on most promising feedstock there was the general agreement among the participants of the telephone conference, that it is currently premature to pre-select specific feedstock options. Multi-feedstock strategies are needed to investigate a broad and diverse range of current and future feedstock and tap into the potential of wastes and residues.

Conclusively, the following important topics with respect to the sustainability of alternative jet fuels were identified during the telephone conference. These topics shall be addressed in further activities implemented in the framework of CORE-JetFuel WG1.

- Continue research on ILUC and develop practical (target-based) approach to tackle ILUC
- Develop stable regulatory framework conditions and (moderate) long-term targets on advanced (jet) fuels
- Engage all relevant stakeholders
- Focus on full value chain approach towards sustainability of alternative jet fuels
- Link feedstock with conversion technologies for the production of jet fuels

- Increase utilization of wastes and residues
- Promote and support best practice approaches
- Respect public concerns

The organizers would like to thank all participants of this first CORE-JetFuel WG1 telephone conference for their active contributions and fruitful discussions.

This conference call served well its purpose of initializing constructive discussions between the stakeholders of Working Group 1 and the CORE-JetFuel Consortium. The continuation of a vivid dialogue is crucial for the project and will be further deepened by dedicated e-mailings and the organization of other problem-specific telephone conferences.

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## **Appendix I**

### **CORE-JetFuel - Coordinating research and innovation in the field of sustainable alternative fuels for Aviation**

**Coordination and support action - FP7 – 605716**

#### **Working Group 1: Feedstock and Sustainability**

**Telephone conference 25 March 2014  
15:00 – 17:00 (CET)**

The aviation industry has set ambitious targets to reduce its environmental footprint, the reduction of greenhouse gas (GHG) emissions being the most crucial one.

While in the near-term technological improvements will assist the aspired reduction of climate-active gases, the sustainable utilization of alternative fuels will play the vital role in the medium- and long-term.

In context of an increased demand for first generation biofuels, the concept of Indirect Land Use Change (ILUC) as a consequence of intensified energy crops cultivation has gained a lot of attention in recent years.

This telephone conference sets out to discuss key issues and challenges of feedstock production and its sustainability performance. Special consideration will be placed on the overarching question, which of the identified issues specifically apply to biofuels and alternative jet fuels. Ideally, recommendations to the European Commission will be derived from the discussion.

After introducing themselves, the participants are invited to briefly state their view on the key issues and challenges stated above.

The following guiding questions will structure the conference call.

#### **Question 1:**

The concept of indirect land use change and its impact on the overall GHG balance of biofuels are highly debated in the scientific community. Some go as far as saying that the uncertainty regarding ILUC factors ranges from 'significant' to 'enormous'.

What is your opinion regarding the use of this concept, also in light of assessing the overall sustainability of alternative fuels for aviation?

Which steps should the European Union take (industrial support, R&D, etc.) to tackle this issue?

**Question 2:**

The European Advanced Biofuels Flight Path Initiative (FPI) has set the objective to achieve in the EU an annual production of two million tons of sustainable biofuel for aviation.

Considering the amount of land that is already cultivated with energy crops for applications other than jet fuel, do you think that this target is feasible?

Is the FPI the right initiative to tackle the needs of the aviation sector to reach their sustainability aims sufficiently?

If not, what other measures would you propose that are in your view better suited?  
What are the barriers to leverage the FPI and to seriously achieve their goals?

**Question 3:**

The RED<sup>1</sup> and FQD<sup>2</sup> contain a provision which requires the European Commission to review the impact of ILUC on the GHG performance of biofuels. The EC proposal from Oct 2012 contains a 5% cap for the total biofuel consumption of 1<sup>st</sup> generation biofuels.

The assumption underlying this proposal is that any additional demand for raw materials for biofuel production would be covered by expanding cultivation areas.

Considering stark efficiency gains in agriculture, do think that this assumption and the 5% cap are based on solid ground?

If ILUC due to the production of 1<sup>st</sup> generation biofuels is the main concern of the debate, why not shift completely to 2<sup>nd</sup> and 3<sup>rd</sup> generation (advanced) biofuels or wastes and residues, where ILUC is not an issue?

**Question 4:**

In terms of GHG reduction potential, what is in your view the most promising feedstock (and according conversion process) for the production of sustainable alternative jet fuel?

- a) in the near-term (until 2020)
- b) beyond 2020

**Question 5:**

Reflecting on what has been discussed during this telephone conference, what aspects of feedstock and sustainability in regard to jet fuel would you consider as most important to look at?

Following your train of thought from the previous question, what results should this Coordination Support Action (or more specifically this Working Group) achieve in your opinion?

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<sup>1</sup> Renewable Energy Directive

<sup>2</sup> Fuel Quality Directive

**Participants**

Andreas Müller	Forschungszentrum Jülich GmbH	<i>invited</i>
Ausilio Bauen	E4tech London	<i>invited</i>
Calliope Panoutsou	Imperial College London	<i>invited</i>
Chris Malins	ICCT	
Daniela Thrän	Helmholtz-Zentrum für Umweltforschung	<i>invited</i>
José Durán	School of Agronomic Engineering, Polytechnic University of Madrid	
Karlheinz Haag	Deutsche Lufthansa	
Marc Gillmann	Total Refining and Marketing	<i>invited</i>
Martina Fleckenstein	WWF Germany	<i>invited</i>
Olivier Dubois	FAO	
Sergio Ugarte	SQ Consult	<i>invited</i>
Warren Mabee	Queen's University / BioFuelNet	
Yuri Herreras Yambanis	Camelina Company España	

**Organizational Details:**

*This call will be conducted by using the conference tool 'GoToWebinar'. For general information about this tool, please visit:*

<http://www.citrix.com/products/gotowebinar/overview.html>

*Prior to the conference call the participants will receive a web link containing all information required for the participation.*

*Participants can either use a headset or dial in via telephone. The provided telephone numbers are local, thereby minimizing the costs.*

## Appendix II

### Olivier Dubois' replies to the questions related to the 25 March teleconference on Core JetFuel

#### Question 1a: What is your opinion regarding the use of the ILUC concept, also in light of assessing the overall sustainability of alternative fuels for aviation?

The ILUC concept is an important one as when it happens it may have quite damaging negative impacts from an environmental (biodiversity, GHG emissions) and food security (farmer's displacement) point of view.

However ILUC impacts are difficult to measure because of the multiple factors that might interfere, and time dynamics. Most of the time it is done through modeling, with all the limitations it entails – different results according to the model used, assumptions and parameters. Another way is to survey farmers which have been displaced to check what they have become. But I know only one study which did this

On the basis of the above, whilst it is important to keep improving the scientific methodology to measure ILUC:

- One should not base policy changes only on the basis of modeling – as is the case of the recent EC proposals
- Much more consideration should be given to the promotion of good practices that minimize ILUC risks and enhance bioenergy/biofuel opportunities Indeed:
  - These good practices are known (such as agro-ecological zoning, sustainable crop intensification, contract farming and [integrated food energy systems](#)) and are included in the FAO compilation of good environmental and socio-economic practices<sup>3</sup>. FAO also proposes some policy measures to promote good practices in bioenergy development<sup>4</sup>;
  - Promoting good practices also allows for the use of performance indicators (regarding the implementation of good practices) and impact indicators, the later being easier and cheaper to assess than the latter. One could therefore imagine a reporting system which would use performance indicators every year, as proxies to impact indicators, which would be measured less frequently. The [Low Indirect Impact Biofuels \(LIIB\) methodology](#) developed by Ecofys, EPFL, and the World Wildlife Fund (WWF) might help carrying out this assessment.
  - The use of performance indicators should be reflected in policies and regulations, in order to promote good practices turn should be included in policies and regulations

#### Question 1b: Which steps should the European Union take (industrial support, R&D, etc.) to tackle the ILUC issue?

Firstly not propose policy changes on the sole basis of one study based on modelling. Modelling help in giving a flavour of what future scenarios could be but by definition do not reflect the reality on the ground.

Secondly, move away from the over-simplistic and misleading dichotomy between food-based/first generation – which allegedly always compete with food and other biofuels – which allegedly don't compete with food . Based on its country/evidence-based work, FAO contends that biofuels are not or bad per se; it depends on how they are managed. In particular, it is over simplistic to assume that food crops/land-using feedstocks ALWAYS compete with food and that energy crops/non-land using feedstocks NEVER do it :

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<sup>3</sup> Available here Good environmental practices 2012 <http://www.fao.org/docrep/015/i2596e/i2596e00.pdf> ; Good socio-economic practices 2012 <http://www.fao.org/docrep/015/i2507e/i2507e00.pdf>

<sup>4</sup> See report available here <http://www.fao.org/docrep/015/i2617e/i2617e00.pdf>

- As examples of food crops/land-using feedstocks which do not necessarily compete with food production, one can cite sugarcane ethanol in Brazil, under some important conditions (e.g. significant yield increase) cassava-based ethanol in Tanzania<sup>5</sup>, and palm oil in smallholder mixed cropping systems in SE Asia;
- On the other hand, examples of energy crops that may compete with food in an indirect way (through land use competition) include jatropha and planted trees (for industrial wood energy or second generation biofuels). Even non-land use feedstocks such as agricultural residues may indirectly affect food security, through their competition with their use for soil fertility and protection, and/or animal feed. Therefore second generation can also hamper food security.

Thirdly, include the promotion of good practices and the use of performance indicators related to their implementation as explained in reply to question 1a.

Question 2a: Considering the amount of land that is already cultivated with energy crops for applications other than jet fuel, do you think that the two million tons of sustainable biofuel for aviation is feasible?

I do not have figures at hand but it is likely that this goal will require imports to the EU. This is not a problem so long as biofuel is produced in a sustainable way

Question 2b: Is the FPI the right initiative to tackle the needs of the aviation sector to reach their sustainability aims sufficiently?

The initiative itself is OK The issue is more regarding where it should be hosted – maybe in the Sustainable Aviation Biofuels Users Group (SAFUG) or International Civil Aviation organisation (ICAO)

Question 2c: If not, what other measures would you propose that are in your view better suited?

The links with the ICAO and SAFUG work should be made more clear

Question 2d: What are the barriers to leverage the FPI and to seriously achieve their goals?

Maybe that there are several important initiatives regarding sustainable aviation biofuels and this might create competition. Therefore more competition and harmonization between these are needed

Question 3a: The assumption underlying the EU proposal - 5% cap for the total biofuel consumption of 1st generation biofuels - is that any additional demand for raw materials for biofuel production would be covered by expanding cultivation areas. Considering stark efficiency gains in agriculture, do you think that this assumption and the 5% cap are based on solid ground?

See answer to question 1b. Broadly speaking, a less risky and more constructive approach might be to promote sustainable bioenergy/biofuel development not so much based on the type of feedstock but more based on the promotion of good practice that reduce risks and enhance opportunities, and, more broadly, the use of available [sustainable bioenergy development tools such as those proposed by FAO](#).

Question 3b: If ILUC due to the production of 1st generation biofuels is the main concern of the debate, why not shift completely to 2nd and 3rd generation (advanced) biofuels or wastes and residues, where ILUC is not an issue?

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<sup>5</sup> More details on this analysis can be found in the FAO report on bioenergy and food security in Tanzania – available here <http://www.fao.org/docrep/012/i1544e/i1544e00.htm>

This is the wrong question. Achieving sustainable biofuels production is not a matter of type of feedstock but a matter of how they are produced

Question 4: In terms of GHG reduction potential, what is in your view the most promising feedstock (and according conversion process) for the production of sustainable alternative jet fuel?

a) in the near-term (until 2020):

b) beyond 2020

Again wrong question for the same reasons as regarding reply to question 3.b.

Question 5a: Reflecting on what has been discussed during this telephone conference, what aspects of feedstock and sustainability in regard to jet fuel would you consider as most important to look at?

GHG performance, food security, technological and economic feasibility

Question 5b: Following your train of thought from the previous question, what results should this Coordination Support Action (or more specifically this Working Group) achieve in your opinion?

- Better coordinate with other sustainable aviation biofuel initiatives
- Better liaise with organisations such as FAO which have recognised expertise in sustainable bioenergy/biofuel production, especially regarding the complex topic of the links to food security

## Appendix III

### Biofuel Feedstock Considerations – Donald Smith

I think that the first point should be the source of feedstocks which are both sustainable and available. These would be in the forms of either agricultural residues, or purpose-grown agricultural biomass, or forestry materials (again, residues or purpose-grown). It is clear that one cannot take all of the agricultural residues; surveys in Canada have suggested that only about 1/3 is sustainable. On the forestry side, the “residue” issue is certainly interesting. The waste material from timber production that was going to pulp and paper production is now increasingly available as biomass, given the steady decline in paper use. With regard to purpose-grown feedstocks (agricultural or forestry), we need to develop better genotypes (including considerations such as growth rate and a cell wall compositions that allow easy conversion of cellulose to sugars, if that is the conversion route selected) and production methods. Additional considerations should include an emphasis on low-input production methods, possibly coupled to a shift from chemical to biological inputs. Economics should equally be considered. With the case of feedstock, biofuel manufacturers have reminded us many times that biomass should not cost than \$50-\$60 CDN t<sup>-1</sup>.

Bioproducts may represent an untapped business opportunity. The general rule for petroleum refineries is that about 50% of their profit comes from about 5% of the materials they produce – the high value monomers for plastics, etc. This will also be true for biorefineries. However, these biorefineries have a competitive advantage over petroleum refineries in that that the feedstock can be genetically modified to enhance the levels of high value materials in, or even add new materials into, purpose grown feedstock crops. Harvest and handling is a big potential part of the cost for these feedstock materials. This step must be effective, inexpensive and consume as little energy as possible. Densification is also a consideration as low density material cannot be transported any great distance without destroying the energy balance.

On the waste side, materials that would have destined for landfills, or sewage, are potentially available. In these cases, the repurposing of such biomass sources alleviates a cost burden for municipalities. Rather than pay ‘tipping tax’ for landfill, so biofuel manufacturers, at least initially, may well be paid to take these feedstock materials. For the potentially land filled materials, there still remains a sorting issue, as the organics must be separated from the rest. For sewage, there is potential to “mine/sequester” any resulting sludge for things like phosphorus, to be recycled back to agricultural lands as fertilizers (as long as heavy metal levels are low or they can be extracted and sold separately). Care must be taken to ensure that the biomass source fits well into the subsequent conversion process, so that both biofuel and bioproducts can be easily co-produced, optimized and profitably extracted. The entire production chain needs to be sustainable in terms of factors, such as energy balance, greenhouse gas emissions, water use and economics. In addition, there is a need to keep the policy makers and the public well informed regarding these processes and their benefits.