

Certify our Future

Food and many other products that we use are, or contain, components derived from biomass and we all want these products to be produced safely. This means we produce them in a way that is not harmful for our environment or for people. The main challenge these days is how to make sure we really do this and how to design sustainable supply chains. I'm very much convinced that sustainability certification is part of the solution. That is why I organized, a workshop on "Geo Information for Sustainability Assessments" in ITC on 13 June. In this special issue of ITC News, several participants will introduce themselves and share some of their work and ideas.

Geo Information for Sustainable Production

Iris van Duren

i.c.vanduren@utwente.nl

Sustainability certification

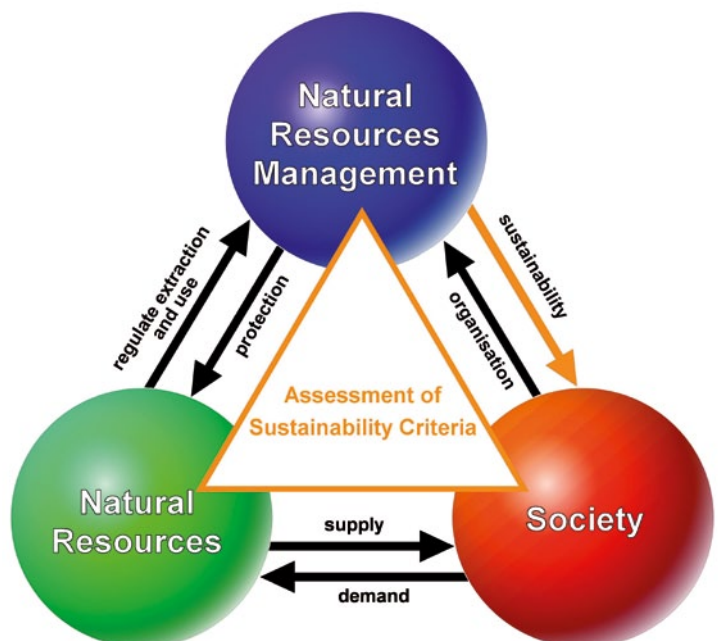
Sustainability certification makes use of a standard. This standard describes when production methods, use and disposal of products are good and when not. Assessments, done by an independent assessor, reveal if a product or a producer meets the requirements of the standard. And "yes" there are still quite a number of hurdles to take and not everything works as we like. But I definitely see certification as an important step in the right direction.

My personal drive to contribute

For me, the issues around sustainable production really came alive during a campaign of the World Wide Fund for Nature (WWF) in the Netherlands. As a volunteer for WWF, I was exposed to a number of serious and quite shocking environmental and social problems related to the production of palm oil. Palm oil is a vegetable oil produced from oil palm fruits. It has many applications in the food industry and besides that it is also used for other purposes such as the production of soap, cosmetics and biodiesel. Unfortunately, in the last decades many things went wrong with establishing and expanding oil palm plantations. Forest fires, biodiversity loss due to forest loss and forest fragmentation, destruction of peatland causing greenhouse gas emissions, land grabbing and pollution are just a number of the impacts that we do not want. The spatial context and power of using remote sensing and GIS to locate and quantify these impacts inspired me to link my ITC research work and teaching to the context of sustainable production of palm oil.

ITC students assessing sustainability of palm oil production

Several students (now alumni) made valuable contributions in the search for reliable and accurate methods, data and tools to assess sustainable palm oil production. Lelyana Midora graduated in 2009 on the use of MODIS NDVI to detect land cover changes in so-called "High Conservation Value Forests". This is strictly forbidden according to the standards for sustainable palm oil



My personal view on how sustainability certification is part of Natural Resources Management. Source: Iris van Duren

production. In the same year Bhawna Sharma modelled carbon stocks in oil palm plantations. It is, of course, important to know what we will gain, what we will lose and how we will influence the carbon cycles when we change our ecosystems from forest to oil palm plantation. Isaac Nooni mapped oil palm plantations in Ghana with a specific classification technique called “support vector machine”, while Abel Chemura managed to estimate the age of oil palms based on object-oriented image analysis of high resolution imagery. Both Isaac and Abel managed to publish their MSc research in scientific journals, which is a great achievement. We will also try this with the research work of Ditte Trojaborg, whose work on automated detection of smallholder oil palm will be explained by herself in a separate article (page 13).

From palm oil to “bio-based”

It started with oil palms, but my interest expanded also to other crops and to “sustainable biomass” in general. I was, for instance, very much intrigued by the many claims and even more by the many believers that bioenergy is a sustainable source of energy. Words such as “bio”, “green” and “bio-based economy” give consumers the feeling that they buy something good and sustainable and the energy sector makes use of this in a clever way. They also have a strong lobby on National, EU and global policy level, enabling them to develop business cases. But I am frequently not convinced that their claim of sustainable production can stand the actual test of sustainable production. That remains to be seen. In that light, a whole series of new topics for MSc research came up.

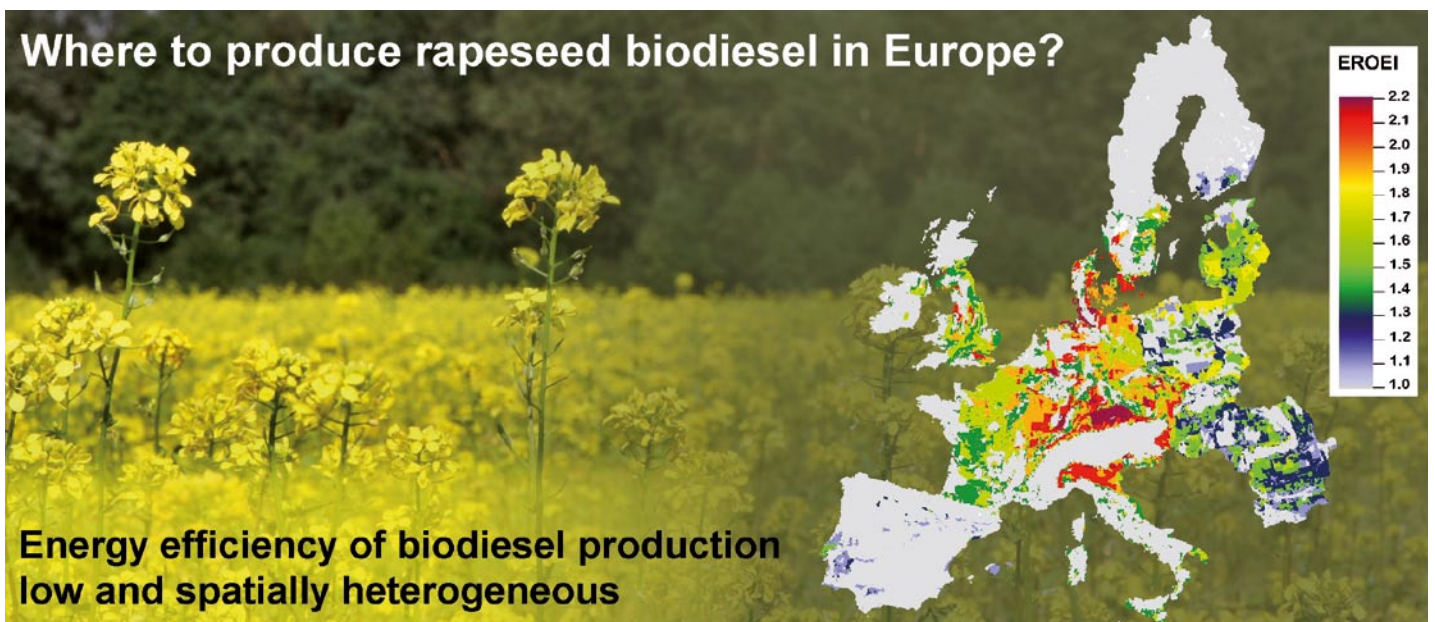
Bioenergy sustainable? This needs careful evaluation.

Together with colleague Alexey Voinov, I supervised a number of MSc studies of which many also ended up in scientific journals. Brandon Wysowsky mapped carbon stocks of roadside vegetation and Lin Qin provided relevant input to estimate the potential of roadside vegetation for bioenergy production. Oludunsin

Arodudu and Shupel Ibrahim explored bioenergy potentials and energy efficiency for built-up areas and rural areas, taking biomass waste material as input for the production process. Melese Firrisa looked at energy efficient rapeseed, a dedicated energy crop grown all over Europe, as input for biodiesel production. This research showed that we have to be careful where we grow rapeseed for biodiesel and where not. Land preparation, fertilization and crop protection in less favorable areas may cost so much energy that sometimes the energy investments hardly gain energy, or even worse, are higher than the amount of energy produced. We need to fully understand the impact and assess sustainable production of biomass.

Geo-information for sustainability assessments

Over the past years, I came in touch with ISCC. This stands for International Sustainability and Carbon Certification which is a standard acknowledged by all EU member states and they grow and operate globally. In the same building in Cologne, Germany, the team of Global Risk Assessment Services can be found. When I went there for the first time with my colleague Tom Loran to see what ISCC was about, I met Norbert Schmitz, Jan Henke, Mohammad Abdel-Razek and many others, I felt that this group of dynamic people is open-minded and that they were moving in a direction where I also wanted to go. They are eager to further develop remote sensing and GIS-based methods to assess various sustainability criteria with a spatial component. Examples are undesired land cover changes, use of fire for land preparation or impacts on areas with a high conservation value. Since one and a half year ITC has been an official member of ISCC. More or less simultaneously, I found out that former ITC colleague Christine Pohl, currently working at the University of Osnabrück, also has similar interests. All came together when ISCC offered an internship for an ITC student. Ditte Trojaborg took the opportunity and did a great job in combining her research work with research that was also relevant for ISCC. Christine acted as external examiner



Graphical abstract of the study energy efficiency of growing rapeseed for biodiesel in Europe (van Duren et al., 2015, *Renewable energy*, 74 pp. 49-59)

during the MSc defence of Ditte which was planned on the same day as part of the workshop. In the plenary session of the workshop we further identified in what way we can join forces.

What's next? After the contextual and technical presentations in the workshop, we closed off with a plenary discussion. The audience was divided into small teams and in the room six flip charts with different questions were put up. At high speed, each team gave answers to these questions. Next, each person could prioritise the points listed on the flip charts. We have summarised these points and soon we will look at how to put these action points into practice. It is an ongoing process, but I feel we are moving ahead and it is fun to work together in this way. Hopefully, after reading the other articles in this special issue, you are inspired by what is going on. If you feel you can also contribute, please, do not hesitate to contact me. ■

“ I was very much intrigued by the many claims and even more by the many believers that bioenergy is a sustainable source of energy ”

Palm oil production and sustainability certification

To allow:

- End users to have (a choice for) a sustainable product

We need to push:

- Producers to produce according sustainability standards
- Financers to invest only in sustainable production
- Governments to put sustainable production in laws and regulations
- Control mechanisms to check sustainable production



Slide presented at the workshop to express the need for sustainability certification for products such as palm oil



Group picture at the end of the plenary session of the workshop