EURURALIS

Factsheet
November 2010



DISCUSSION SUPPORT SYSTEM STRENGTHENING GLOBAL AND REGIONAL DIMENSIONS IN POLICY IMPACT ASSESSMENT

What will happen to the world in the forthcoming time? How will it impact on European agriculture and rural areas? What kind of threats and opportunities for socio-cultural, economic and ecological values can we expect? How do global issues (climate change, competing claims, world food prices, food security, sustainability) shape agriculture inside the EU and other regions in the world? What are adequate international policies and what is their effectiveness? The EURURALIS consortium developed a discussion-oriented tool that addresses these challenges for Europe in detail. To deal with sustainability issues in other regions in the world and especially in developing countries a similar sustainability assessment tool, called GLOCAL, could be developed.

EURURALIS provides a toolbox for exploring sustainability impacts of drivers and policies on the global and local scale

The ambition of the EURURALIS project is to develop a discussion-oriented tool to support policy makers in discussions about the future of rural areas in the EU27 with scientifically sound data and methodologies. Eururalis 1.0 and 2.0 were initially developed with help of the former Dutch Ministry of Agriculture and it is now supported by several EU countries (see: WWW.EURURALIS.EU). The results have been presented on several meetings with policy makers, scientists and are used in education programs on several universities. It has proven to be a helpful tool in discussing the future of rural Europe amongst policy makers and stakeholders. It is also a way of integrating scientific sound methods in impact assessment studies and the output is published in peer reviewed scientific journals. The work program for 2010 is guided by the recent policy developments in the Common Agricultural Policy (CAP), World Trade Organization (WTO), Renewable Energy Directive (RED) and Reducing Emissions from Deforestation and forest Degradation (REDD). Regional and global dimensions are on focus. An important feature of the EURURALIS toolbox is the consistent linkage between economic and biophysical domains and the linkage between global and local scales. Results of the project are the development and implementation of innovative methodologies for policy assessment (e.g. new agro-biodiversity indicator, spatial policies) and the assessment of the impact of the mentioned policies on people, planet and profit indicators.

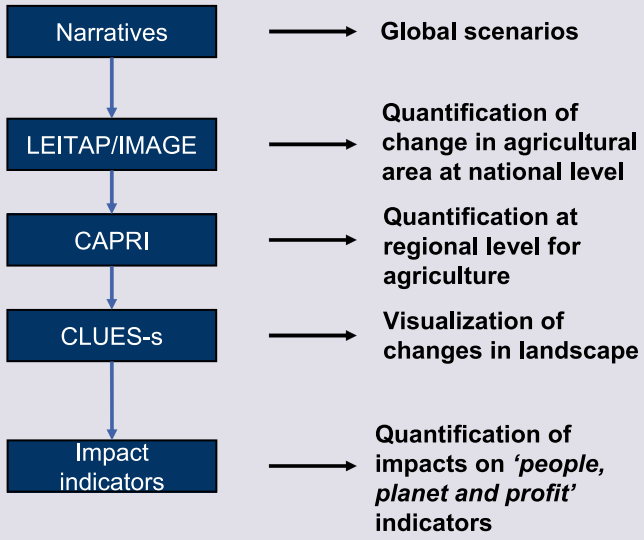

Figure 1 EURURALIS modeling framework.

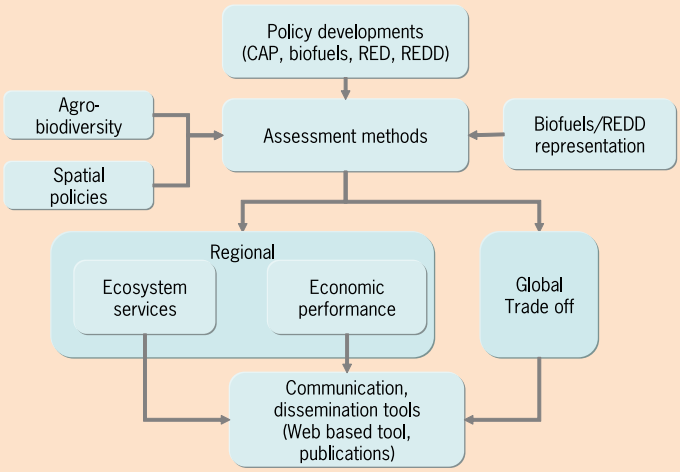

Figure 2 EURURALIS framework.

Modeling Common Agricultural Policies in EURURALIS 2010

Hans van Meijl, LEI, WP leader

The perspectives of the Common Agricultural Policy (CAP) after 2013 have to be designed. The Dutch Ministry of Agriculture, Nature and Food Quality has presented his vision for the future (The 'Dutch outlook' or "Houtskoolschets"). The Dutch Outlook proposes to transform the direct income support under the Single Payment Scheme (SPS) to more targeted payments to strengthen the competitiveness of the European agricultural sector and its contribution to public goods as nature, environment and bio-diversity. In 2009-2010 a first quantitative impact assessment was performed of a stylised Dutch Outlook CAP reform scenario for the EU-27 as a whole (Helming et al., 2010). This study investigates the effectiveness of post 2013 CAP measures. Next to the measures proposed in the Dutch Outlook the effectiveness of base premiums are considered as this measure is proposed by other Member States. This study can be seen as a first attempt to quantify the transition to a CAP with more targeted measures at the European level and reveals considerable methodological and data challenges. A key finding is that the impact of the various measures is very different with regard to various economic and environmental indicators. The impact of a measure also differs between regions, sectors and farm types. EURURALIS 2010 deepens and extends the research by a better treatment of non-economic indicators (agro-biodiversity, land abandonment), improved representation of regional policies and development of a module of structural change at farm and sector level (farm size and number of farms).

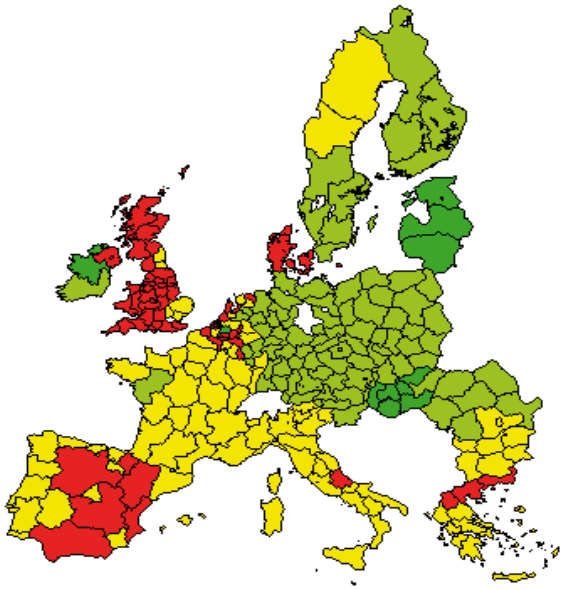

Figure 4 Effectiveness of competitiveness measures on regional supply of cereals (% change compared to reference).

Source: CAPRI

Less than 0%	Between 0% and 1.5%	Between 1.5% and 5%	More than 5%

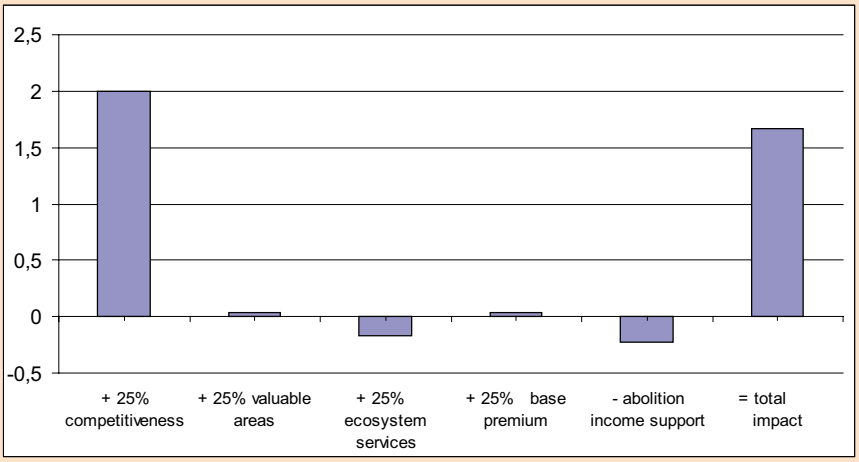

Figure 3 Effectiveness of individual measures and total impact of stylised CAP reform scenario on agricultural production in the EU-27 (% change compared to reference).

Source: LEITAP

Regional policies and land-use change
Peter Verburg, IVM, WP leader

Many European policies related to agriculture and environment have spatial dimensions. Such policies target at avoiding negatively perceived developments in specific rural areas or target land use planning to preserve valuable biodiversity values or ecosystem services. Typical examples of such policies are for example various measures within the Second pillar of the Common Agricultural Policy or the Habitat Directive. Some policies, such as the Less Favoured Area compensations, are aimed to specific regions while others, such as agri-environmental schemes, are more applicable to certain regions and landscapes than to other regions. It is expected that such regionally targeted policies and related land use planning in rural areas will face new challenges related to adaptation to climate change and maintenance of biodiversity. Adaptation to climate change mostly takes place by watershed-based measures such as afforestation of upstream catchments and accounting for flooding risks in downstream land-use planning. Also at wider scale such policies gain importance: incentives such as REDD (Reducing Emissions from deforestation and forest degradation) target at regions worldwide with valuable forest resources, especially those with high carbon storage.

Within the EURURALIS assessments regional policies are mostly accounted for by the spatial land use model CLUE. Land-use effects of regional policies are well elaborated in the spatial modeling framework. However, they are only accounted for to a limited extent in the macro-economic global-scale assessment models. These models provide an overall assessment of land change in response to scenario conditions at the scale of nations within the EU and world regions outside the EU. Regional policies are implemented below the scale of assessment in these global scale models and therefore not explicitly accounted for. Methods to enhance the feedback of regional policies to macro-scale models are currently being developed to better ensure the compatibility between different modeling.

Assessments of biodiversity policies on habitat fragmentation

As an illustration of the evaluation of region-specific policies a scenario that includes potential incentives to better preserve biodiversity through the establishment of ecological corridors, enhanced protection of buffer zones around Natura 2000 and other incentives is compared to a reference scenario. The resulting land use allocation patterns are compared in terms of fragmentation. Both scenarios show pressure on land and agricultural resources in Eastern Europe leading to a further habitat fragmentation. However, due to regional policies a number of regions clearly show a positive response in terms of landscape fragmentation. In the UK in particular the negative response in a number of regions is turned around into a positive effect on landscape connectivity. However, at the same time trade-offs to regions that do not benefit from the regional policies are seen. Overall, the spatial policies tend, in this case, to have a smaller effect as compared to the overall changes in land use as result of changes in agricultural demand and urbanisation.

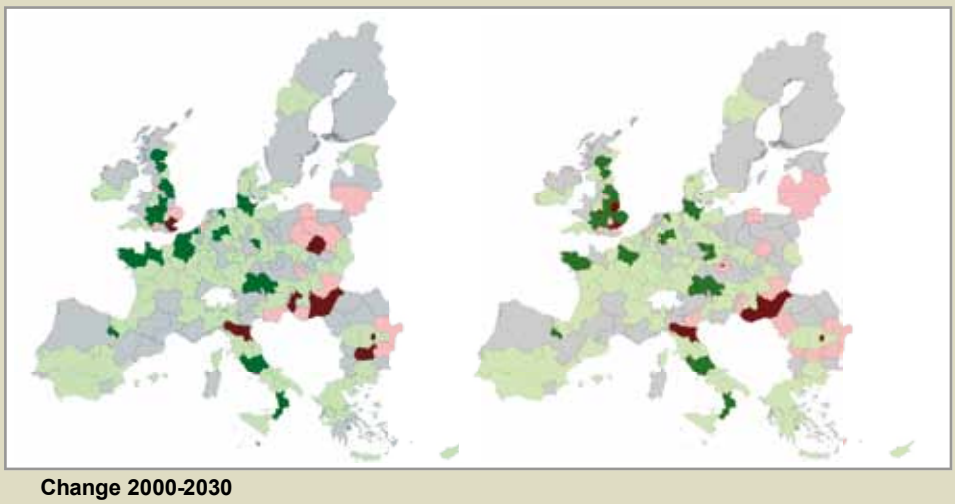

Figure 5 Assessments of biodiversity policies on habitat fragmentation.

Biodiversity indicator targeted at agricultural areas is essential to evaluate biodiversity objectives in the CAP

Assessing biodiversity in agricultural areas
Koen Overmars, PBL, WP leader

Current Common Agricultural Policy (CAP) measures include biodiversity objectives in agricultural areas, and this will most probably continue in the future CAP. In this study a new biodiversity indicator is presented that is targeted specifically at biodiversity in agricultural areas.

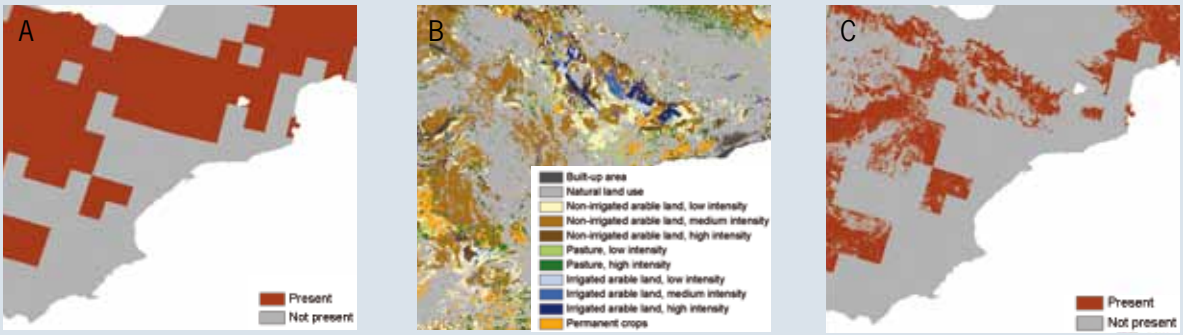

Figure 6 Methodology: for each species included in the analysis the spatial distribution is detailed according to the pressures to form a detailed species presence map A; Species distribution of one of the species considered map B; One of the pressures: land use, including intensity map C; Resulting map.

The methodology, which is based on Bioscore (ECNC, 2009) and Eururalis, is applied to a reference land use map of the year 2000. Figure 7 below presents how well an agricultural area performs in terms of biodiversity relative to its potential. In other words, this map shows the relative influence of the pressures. The pattern of agricultural biodiversity is to a large extent the result of land use and land use intensity. For example, intensive arable farming in North-Western Europe and irrigated areas in Mediterranean countries negatively influence biodiversity. The map can serve, for example, as the reference point to which ex-ante policy evaluations can be compared.

When two situations are compared, two issues are of crucial importance to the interpretation of this indicator of biodiversity in agricultural areas. First, there is the trade-off between natural biodiversity and biodiversity in agricultural areas. Second, a distinction should be made between general biodiversity and the high biodiverse areas (e.g. HNV farmlands).

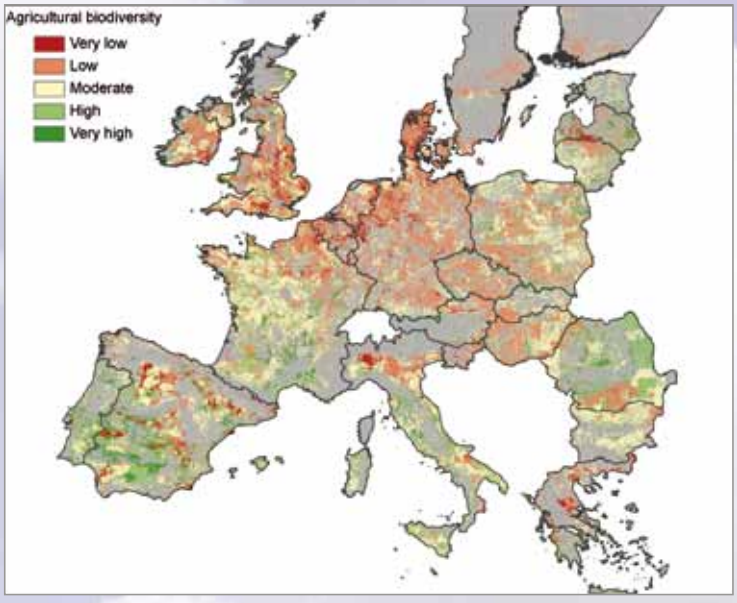

Figure 7 Agricultural biodiversity relative to its potential. (Only agricultural areas area coloured)

How much deforestation can be avoided at which costs? How REDD measures influence the spatial pattern of land-use change?

Land use and greenhouse gas effects of biofuel mandates
Elke Stehfest, PBL, WP leader

Biofuels seemed to be an attractive option to reduce greenhouse gas emissions and climate change. However, concerns about the induced (indirect) land-use change and small or negative greenhouse gas savings has dampened this enthusiasm. EURURALIS explores the impact of European and international biofuel targets on global land use, GHG emissions, and the agricultural sector. Agricultural expansion, mainly in North and South America, and Europe (Table1) leads to significant CO_2 emissions from land conversions, which are higher than the savings in fossil fuel emissions over the next 20 year. As the negative impact of biofuels on GHG emissions and biodiversity might be dampened by additional regulations, the effect of extended nature reserves and protection of carbon rich ecosystems on global land use, emissions, and commodity prices under an ambitious biofuels scenario was explored. The LEITAP model (modified GTAP model and database) coupled to the integrated assessment model IMAGE were used for the assessment.

Table 1 Change in Cropland Area due to European and OECD Biofuel mandates, compared to the baseline in 2020 [%].

	BioEU	BioOECD
NAM*	2.8	7.8
Brazil	4.9	5.7
RLA*	1.7	3.0
Europe	7.1	7.6
SSA*	0.2	0.7
FSU*	1.8	2.6
Turkey, ME*, NA*	0.6	0.8
SSEA*	0.5	0.3
China, Korea, Japan	0.7	0.9
Oceania	0.7	1.4
World	1.7	2.8

* NAM – North America, RLA –Rest of Latin America, SSA – SubSaharan Africa, FSU – Former Soviet Union, ME – Middle East, NA – Norther Africa, SSEA South and South East Asia

Effects of REDD policies on land use
Elke Stehfest, PBL, WP leader

The Reducing Emissions from Deforestation and Degradation policy (REDD) is discussed as an important climate policy instrument. It is a potentially attractive instrument for countries with high deforestation rates like Brazil and Indonesia, and may strongly influence the development of land use there.

- How much deforestation can be avoided at which costs?
- How will REDD measures influence the spatial pattern of land use change?
- What indirect effects of REDD policies can be expected (land use change in other regions, or on other types of land, containing less carbon?)
- How will REDD measures influence commodity prices?

To answer these questions, a methodology to account for REDD in LEITAP and IMAGE has been developed within the framework of EURURALIS.

Based on a series of LEITAP runs with increasing protection of carbon rich areas, a cost curve for REDD is created (Figure 8). Such a cost curve depicts avoided emissions as a function of carbon price, and can then be applied in integrated climate mitigation analysis with FAIR, TIMER, IMAGE and LEITAP. Additionally, implications for commodity prices, and land use consequences can be calculated in IMAGE. Earlier results (Figure 9) show that protecting land for its carbon content only leads to a significant reduction in emissions, but also leads to displacement of agricultural expansion. Including biodiversity in REDD schemes (REDDplus), could make sure that REDD policies do put non-forest ecosystems under pressure.

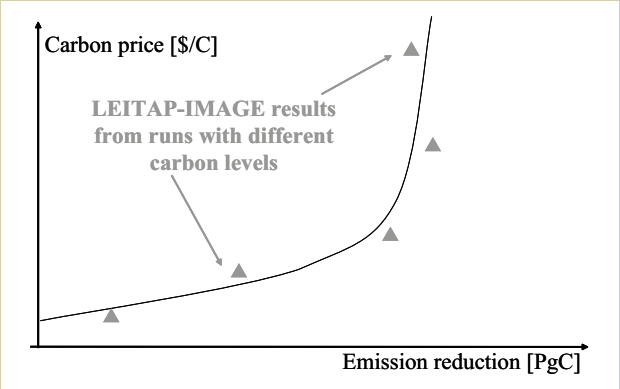

Figure 8 Concept for creating Marginal abatement cost (MAC) cost curves based on LEITAP – IMAGE.

A web-based tool allows for presenting EURURALIS results in a dynamic and interactive way.

Table 2 Change in cumulative Carbon emissions due to European and OCED Biofuel mandates, compared to the baseline.

	Reduction of fossil-fuel emissions	Difference in land-use emissions	Net difference fossil & land-use
	[Pg C]	[Pg C]	[Pg C]
BioEU, Cumulative difference over 20 years	-0.4	0.56	0.16
BioOECD, Cumulative difference over 20 years	-0.96	1.66	0.70

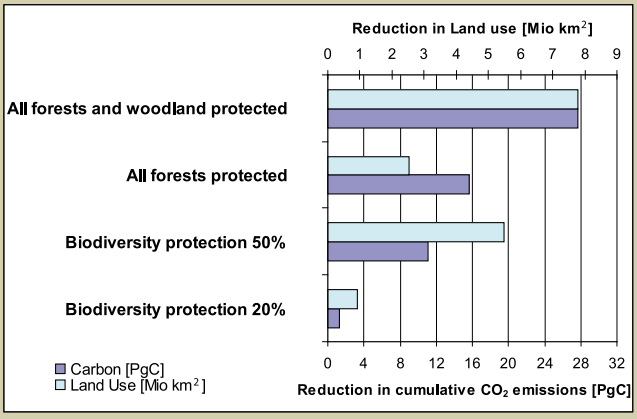

Figure 9 Effects of protecting land for its Carbon or Biodiversity, compared to a baseline scenario, in 2030.

Eururalis 3: a web-based discussion support tool
Rob Lokers, Alterra, WP leader

With an increase of public scrutiny towards science and its results, transparency and public availability of scientific methods and results become crucial to maintaining trust and credibility of public in science. The EURURALIS project has been leading the way in providing tools for stakeholders to browse results of the integrated multi-scale modelling with Eururalis 1 and 2. Eururalis 3 is the new version, which is available as a website, allowing everyone to visit it without need for installation and expert knowledge. Eururalis 3 is map-based, allowing for easy interpretation of assessment results at multiple spatial scales. Results of various people, planet and profit indicators for different scenarios can be compared through time and on different spatial resolutions.
See: http://scomp0396.wur.nl:8080/eururalis3_0_1

Selection of EUruralis output:

Banse, Martin, Hans van Meijl, Andrzej Tabeau, Geert Woltjer, Fritz Hellmann and Peter H. Verburg; Impact of EU Biofuel Policies on World Agricultural Production and Land Use, Biomass & Bioenergy. (Forthcoming)

Banse, M., H. van Meijl, A. Tabeau and G. Woltjer, 2008. Will EU Biofuel Policies affect Global Agricultural Markets? European Review of Agricultural Economics, 35: 117-141.

Eickhout, B., H. van Meijl, A. Tabeau and E. Stehfest, (2009). The impact of environmental and climate constraints on global food supply. In: 'Economic Analysis of Land Use in Global Climate Change Policy', edited by T. Hertel, S. Rose and R. Tol, Routledge, USA.

Eickhout, B. and A.G. Prins, 2008. Eururalis 2.0 Technical background and indicator documentation. Wageningen UR and Netherlands Environmental Assessment Agency (MNP) Bilthoven, The Netherlands.

Assessment Agency (MNP) Bilthoven, The NetherlandsECNC. (2009) BioScore: A tool to assess the impacts of European Community policies on Europe's biodiversity, ECNC-European Centre for Nature Conservation, Tilburg.

Hellmann F, Verburg PH. (2010). Impact assessment of the European biofuel directive on land use and biodiversity. Journal of Environmental Management. 2010; 91(6):1389-96.

Helming, J.F.M., Janssen, S., Meijl, van, H., en Tabeau. A., (2010). Impact assessment of post 2013 CAP measures on European agriculture. LEI report. The Hague. (Forthcoming)

Prins, A.G., B. Eickhout, M. Banse, H. van Meijl, W. Rienks and G. Woltjer. Global impacts of European agricultural and biofuel policies, Ecology and Society. (Forthcoming)

Rienks, W.A., et al. (2008) Eururalis: an integrated impact assessment framework to support policy discussion about the future of Europe's rural areas.

Stehfest, E., Woltjer, G., Tabeau, A., Prins, AG., Banse, M., Eickhout, B., van Meijl, H. Land use and greenhouse gas effects of European and global biofuel mandates. (Forthcoming)

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For more information see: WWW.EURURALIS.EU

The Future: From EURURALIS to GLOCAL

One of the key challenges in the future is how to feed the world and at the same time fight climate change. The EURURALIS consortium wants to contribute to this key challenge by broadening its international scope and partnership. A possibility is to create a global consortium, called GLOCAL, which develops sustainability impact assessment tools for all countries in the world and especially for developing countries. If you are interested in more information or possibilities to cooperate please contact. Hans van Meijl, hans.vanmeijl@wur.nl

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