European Network for the durable exploitation of crop protection strategies

IA3 Activity: *Human resource exchange*

ENDURE - Internal Mobility

Final activity report

(This form has to be completed and sent to the activity leader – the message should be sent to his p.a. elisa.scanzi@ibaf.cnr.it – within 15 days of the end of the visit)

Topic of the visit
SYNOPS model; implementation of data

1. Information about researcher and sending partner

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Professional status: Senior scientist

Sending partner: BBA, Federal Research Centre for Agriculture and Forestry

Institute/Department/Research Unit: Institute for Technology Assessment in Plant Protection

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Supervisor name*:-

Supervisor e-mail*:-

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*Supervisor information only for PhD student, post-doc and junior researchers

2. Information about hosting partner

Hosting partner: AGROS

Institute/Department/Research Unit: Agroscope Reckenholz-Tänikon

Address: Reckenholzstr. 191, 8046, Zürich, Switzerland

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Supervisor phone number*: 0041 44 377 73 50

***** For senior scientist indicate the name of the collaborating colleague

3. Information about the visit

Duration: 2 weeks

Start date: 22.09.2007

End date: 05.10.2007

4. Description of the activities and outcomes

Background and context:

The approach of GIS-based risk assessment tools like SYNOPS is focusing on the risk to aquatic and terrestrial ecosystems by considering the regional and landscape specific environmental parameters and plant protection strategies. It's strength is the regional specific analysis of the environmental risk potential
On the other hand Life cycle assessment methodology is suitable for an analysis in the context of the whole cropping system because it allows to assess impact of cropping and farming systems and pest control strategies and it considers the whole life cycle.
Within sub activity RA3.4 it is aimed for to get an overview of existing methods for risk assessment of pesticide currently used within Live Cycle Assessment and the methods used in the partner institutes (SYNOPS, I-Phyt and USES-PRZM) and to select the most appropriate method for ENDURE and apply it to relevant case studies Therefore close cooperation is needed between research institutes dealing Live Cycle Assessment and Risk Assessment.

Objective:
The overall objective of this exchange visit was to make the first steps towards a comparison and integration of existing tools and methods for environmental risk assessment and Live Cycle Assessment.

Activities carried out:

a) **Comparison and adaption of the active ingredient database**
An essential basis for comparing different risk assessment tools, is a common basis of input data. Therefore a first step in the direction of a common input database was a comparison of the available active ingredients and its physical and eco-toxicological parameters in SYNOPS and in the risk assessment tools used by the LCA methods (EDIP+,USES-LCA and Impact 2000). It was found that only some active ingredients, which were available in SYNOPS were also available in EDIP+,USES-LCA and Impact2000. Additionally differences in the values of the input parameters could be found. It was therefore decided to adapt the active ingredients database of SYNOPS as a basis for the LCA Methods and to extend the database by physical and eco-toxicological parameters, which were not yet included (e.g Henry constant, human toxicity values).

b) Selection of appropriate strategies for the integrated apple production in the Lake Constance region in Germany
An extended pesticide use survey for fruit production was conducted in Germany in 2004. This dataset includes 50 application strategies for apple in the region of Lake Constance. Since the LCA methods could not evaluate all fifty strategies it was decided to choose 3 strategies of medium risk potentials and one strategies with high and on with low risk potentials to represent the integrated pomefruit cultivation in the Lake Constance region. The pesticide use dataset has been evaluated using a rank analysis to select the five strategies on the basis of typical environmental data for the Lake Constance region.
Application strategies for organic apple production in the Lake Constance region are not yet available. First contacts to make these strategies available have been made.
A similar evaluation will be conducted for the wheat region in Saxony-Anhalt.

c) The environmental parameters derived form ATKIS were evaluated to give set of five characteristic combinations of field and climate data to represent the region Lake Constance.
SYNOPS represents GIS-based risk assessment tool. When SYNOPS is use in the regional mode it calculates risk potentials for all fields within the considered region. The field base input parameters are derived from an extended GIS database called ATKIS in combination with digital soil maps and digital elevation models. Using further GIS-procedures these results are then aggregate to represent the region. It was clear, that such approach can not be conducted with the LCA methods at this point. Therefore geo-referenced database was analysed in order to find set of five combinations of environmental, field and climate data to represent the Lake Constance region. These datasets were also be assumed to be valid for the apple production region on the Swiss side of Lake Constance with the exception of the climate data. For the climate a Swiss climate station was integrated into the SYNOPS database.

d) Strategies for the integrated organic apple production in the Lake Constance in Switzerland were provided by ART.
There strategies for integrated and organic apple production have been provided by ART. The strategies were put in a form that they could be assessed with SYNOPS. The calculated risk potentials were in a similar range as the German strategies for the integrated production. The strategies for the organic apple production showed higher risk potentials than for the integrated production.

e) The SYNOPS risk assessment tool has modified, that it will run on computers in ART and use local database including the described datasets.
In order to run the SYNOPS a few changes had to be made, that SYNOPS was able to extract the input datasets from local database. Also the output tables were changed in a way that the results could easily be read by the LCA methods.

At this point SYNOPS can only be used outside of the LCA method. It can ce used additionally to the risk assessment tools which are integated within the LCA-method(EDIP+, USES-LCA and IMPACT2000). To integrate SYNOPS into the LCA method further work is needed, which was planned to be accomplished during the exchange visit of Thomas Kägi to BBA

The work with the common database showed that the data could not easily be integrated in EDIP+ and IMPACT2000. The integration of the active ingredients is possible but was too time consuming for the duration of the vist. Therefore no direct comparison of the results could be accomplished. It has been decided continue with this work during the exchange visit of Thomas Kägi to BBA

f) Criteria list for the evaluation of the risk assessment tools has been finalised.
During the last RA 3.3-3.4 in May 2007, C. Bockstaller presented a proposal on evaluation criteria for selection suitable methods for an LCA application distributed in 3 groups: scientific soundness; feasibility and utility.

It was decided to adapt those criteria to the evaluation of indicator methods assessing the impacts of pesticide in an LCA framework. The criteria list is restricted to the group “scientific soundness”. During the visit this list has been discussed and revised by the involved partners.

g) Colloquim: Presentation of the regional approach of SYNOPS:

Application of a GIS-bases risk assessment tool
for three fruit growing regions in Germany

5. Links between visit activity and ENDURE

The following two objectives of subtask RA3.4 clearly show the close link of the accomplished tasks to this sub activity.
a) to get an overview of existing methods for risk assessment of pesticide currently used within LCA and the methods use in the partner institutes (SYNOPS, I-Phyt and USES-PRZM)
b) to select the most appropriate method for ENDURE and apply it to relevant case studies.

6. Impact

Added value for the researcher: *maximum 10 lines*
See Section 4

Added value for sending partner and hosting partner: *maximum 10 lines*
See Section 4

Date of submission
29.02.2008

Dr. Maurizio Sattin
IA3 activity leader

Approved
06/03/2008