

Summary Progress Report

Section 1: PROJECT IDENTIFICATION Information to be provided for project identification		NOT CONFIDENTIAL	
Title of the project: Development of a model based decision support system to optimise nitrogen use in horticultural crop rotations across Europe			
Acronym of the project: EU-Rotate_N			
Type of contract: RTD Shared Cost		Total project cost (in euro) 3,664,759 €	
Contract number: QLK5-CT-2002-01100	Duration (in months) 48 Months	EU contribution (in euro) 2,299,080 €	
Commencement date 01/01/2003		Period covered by the progress report (e.g. 1 February 2000 – 31 January 2001) 1 st January 2006 - 31 st December 2006	
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Key words (5 maximum - Please include specific keywords that best describe the project.). nitrogen , fertilizer , model , rotations , economics			
World wide web address (the project's www address) www.warwick.ac.uk/go/eurotaten			
List of participants Provide all partners' details including their legal status in the contract i.e., contractor, assistant contractor (to which contractor?).			

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Section 2: PROJECT PROGRESS REPORT

Objectives:

The aim of this project is to develop and evaluate a model-based decision support system to optimise nitrogen use in both conventional and organic field vegetable rotations across Europe. This will help Member States to minimise hazards to the environment by adopting consistent approaches to improved efficiency of nitrogen use for different production systems and climatic regions of Europe and to optimise production of quality crops while enhancing the economic sustainability of horticultural production within the EU.

Results and Milestones:

The project commenced on the 1st January 2003. During the 36 to 48 month reporting period two full participant meetings were in Spain and Germany. The fourth project newsletter is ready for publication. All major milestones were completed in this the final reporting period. The model being the most important deliverable allowed the work comparing case studies to be carried out. The model including supporting documents is now on the internet. The research is divided into five workpackages, a brief report of progress is described below.

During the fourth reporting period, two full participant meetings have been held. The first in Gandía, 25 – 27th April, reviewed the validation of the model and the second in Potsdam, 20 - 22 November, finalised this validation and discussed progress of the evaluation of economic and environmental performance of case study rotations. Finally the format of the final deliverable model was discussed, implemented and released.

Workpackage 1 (WP1). Much of the work within this workpackage had been completed in earlier reporting periods but there was a need to correct both coding and logical errors in the model sub-routines that came to light during the validation process. At the end of the first meeting in Gandía the modifications required to improve the operation and accuracy of the model were prioritised. These modifications were implemented by mid-summer. During this period the parameter values required for the operation of the model for the growth of many crops were also refined and incorporated into the parameter files of the model.

Workpackage 2 (WP2) deals with the evaluation of the effects of varying levels of nitrogen supply on product quality and farm income. Further work was needed to fine tune these relationships following validation in WP4. An additional harvest index parameter was included to allow better simulation of the fraction of material returned to the soil as residues. The algorithms required to provide the gross margin output of the model were also finalised.

Workpackage 3 (WP3). Work here finalised the development of the model for work in WP5 and the final model release. During the first half of the reporting period there were two work strands, one to finalise the FORTRAN model and the second to complete the development of the Java model framework. This work was supported by the use of a subcontract with TESSELLA who originally developed the basis for the Java framework in the first and second reporting periods. During the summer of 2006 it became obvious that the developed Java framework would require too much time to complete it during the life of the project. At this stage the FORTRAN model was already complete and had largely been validated by the project partners so TESSELLA again assisted in the development of the model triggers needed to set up the case studies in WP5. This work was completed and the model was transferred to the project partners to carry out WP5 in October 2006. During model development documentation was prepared to support

the users of the model and this is now available on the Internet and on a Demonstration CD.

Workpackage 4 (WP4) assessed the new decision support system for fitness of purpose across cropping rotations in Europe. The datasets available from the field experiments carried out as part of this project were finalised during this reporting period. The model was released for validation at the end of the last reporting period. Many coding and logical errors were found in the first few months of the validation process. These were reviewed during the project meeting in Gandía and again during the meeting in Potsdam. Experiments in all partner countries were used in the validation process and a report summarising the progress of this was made. Whilst the model was not accurate in every respect its use in the validation phase trained the users in the appropriate way in which it could be used to test the effects of different management strategies on economic and environmental outputs in WP5. The steps needed to use the model appropriately are highlighted in the validation report and within the release documentation of the model. At the final meeting a list of these issues were made in order to provide scope and opportunities for future development..

Workpackage 5 (WP5) evaluated agricultural strategies with respect to N losses and economics. The start of work within this workpackage was delayed but was also streamlined. Individual participant countries worked in parallel to select and carry out their own scenario runs. The work carried out here did confirm the benefits of the model in choosing between fertilizer strategies indicating that there could be savings in fertilizer use even if existing codes of good nitrogen practice were followed as there were some instances where typical farm practice applied excessively high amounts. However in some particular regional locations and for certain high value crops, larger amounts of fertilizer than current GAP could be justified without increasing nitrogen losses to the environment. The failure to follow GAP was attributed to lack of awareness and the perceived risk of crop failure. Farmers awareness of GAP needs to be improved, current implementation of GAP needs to be the first policy target with some flexibility given to some higher value horticultural crops where regulated higher amounts of N fertilizer need to be applied to ensure economic sustainability.

Benefits and Beneficiaries:

Now that the project is completed we have a model and results which can be released to the wider scientific community, policy makers, consultants and growers. We can demonstrate the model's use in evaluating the effects of different N management strategies on N losses and gross margin from a range of field vegetable rotations in northern, central and southern Europe.

Future Actions (if applicable):

Following the release of the model on the internet and as a CD, a whole range of dissemination and exploitation activities are planned during 2007 and 2008.

All project partners have plans to incorporate further development and use of the model in their future research.