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## NUTRIENT MANAGEMENT PLANNING SYLLABUS

### Introduction

To prepare FACTS Qualified Advisers (FQAs) to manage the challenges of the Water Framework Directive (its associated initiatives and regulations), greenhouse gas mitigation strategies and soil protection, while also improving farm profitability, industry leaders have urged the FACTS Committee to introduce this topic of training in Nutrient Management Planning as core CPD training.

Nutrient Management Training is compulsory for all current FACTS Qualified Advisers and those gaining the qualification prior to 31<sup>st</sup> December 2009. We expect that over 3000 people will require training for the 6 modules by the end December 2014. Only those who have attended the Train the Trainer Events and taken the Nutrient Management Exam are able to offer the training. The modules and points will NOT be awarded to anyone who submits points with a trainer who has not gained the NMP Qualification.

FACTS Qualified Advisers now have recognized roles in implementing NVZ rules, the Code of Good Agricultural Practice and assurance schemes. FACTS membership will benefit if this recognition is maintained and extended and, to this end, the FACTS Management Committee has agreed a need for some on-going training.

A new Nutrient Management Planning course, comprising six modules, has been developed and is now available to current FQA's who will need to complete this course training by December 2014 if they are to retain their FQA status beyond that date. The same arrangement will apply to subsequent five-year periods. The outline is:

- Current FQAs will have to complete the training within 5 years from January 1<sup>st</sup> 2010.
- The five-year period for new FQAs will begin from the date they qualify.
- Anyone not trained within their allotted 5 years will lose FQA status. A Web Based Assessment will be made available to all those who have completed the 6 cpd training modules and all those who subsequently complete the course. Successful completion of the Web Based Assessment will be necessary if individuals wish to retain their FQA Status.
- To rejoin the FQA list, individuals will need to attend all 6 CPD training modules and take the exam. The recommended training time is 2 ½ days.
- Course content will be updated at intervals as regulations change or agronomic practices develop.
- An exam will be optional; this will comprise a written paper and a panel viva examination. An email will be sent to those who have not started the training around 2 years prior to the cut off date.
- The modules can be used towards the BASIS Diploma in Agronomy if the examination is passed. Examinations should be provided by a BASIS Approved Trainer (to comply with Quality Assurance Standards).

Where candidates wish to take the exam, minimum numbers will apply; if there are insufficient numbers on any particular course there will be opportunities for taking the exam at a later date. Exam dates will be available on the BASIS website, [www.BASIS-REG.com](http://www.BASIS-REG.com)

**Please Note:** Training within the required timeframe is the responsibility of individual candidates.

## The Examination

The written examination will be approximately 2 hours in duration and with two component parts and an additional viva lasting 15 - 20 mins.

<u>Multi-choice</u>	30 mins
30 multi-choice questions covering topics from all 6 modules (no books allowed)	

<u>Farm Scenario</u>	90 mins
"open book" farm scenario with examples of crop nutrition, utilisation of manures, environmental implications	

<u>Viva Panel</u>	15-20 mins
The viva will be conducted by the exam chairman and an industry expert.	

The pass mark is 70% for the multiple choice and 60% for the scenario paper. Candidates must pass each section of the examination in order to be successful and to be awarded the BASIS Nutrient Management Planning Certificate.

This qualification may be used towards BASIS Diploma as an Advanced Crop Module.

## Background

This nutrient management planning syllabus is designed to offer FQAs a training programme which will enable them to have the right type of competency in nutrient management planning and associated practices. The need for appropriately qualified and proactive advisers to support the sustainable production of grassland, arable and horticultural crops is essential in the context of Catchment Sensitive Farming and pressures on farm profitability.

Detailed planning of plant and crop nutrition is required to reduce the environmental impact on soil, water and air. Important policy drivers for this are the Water Framework Directive, particularly important with respect to phosphorus, as well as nitrogen, the revised NVZ Action Plan and looming policies on greenhouse gases, for which compliance can be addressed as far as possible by good nutrient management practices.

In addition, concerns over fertiliser security and traceability are being built into everyday nutrient management activities on farms and associated business enterprises and all advisers and agronomists need to be abreast of the latest requirements of the Fertiliser Industry Assurance Scheme.

## Module 1 – Achieving crop nitrogen utilisation efficiency

Attention to the relationship between crop yield and farm income per tonne of nitrogen used and greenhouse gas (nitrous oxide) emissions, ammonia emissions and nitrate in water are highlighted as being a priority for farm businesses and politically important issues for the next 5 years.

The trade bodies of agriculture have committed their members to being global business leaders in nitrogen use efficiency. Demonstrable improvements will need to be delivered by an overall better integration of all key nutrients and their interaction with nitrogen on the farm. The work of the farmer and the advisor to deliver these changes is being relied upon.

- Matching nitrogen inputs with crop or plant requirements
  - Total nitrogen requirement of the crop
  - Uptake of nitrogen in relation to the growth of the crop
  - Nitrate concentration in ready-to-eat vegetables
  - Nitrogen supplied from the soil
  - Managing nitrous oxide by improving efficiencies in N utilisation
- Interaction of nitrogen with other nutrients, particularly P, K and S
  - Importance of other nutrients for nitrogen use efficiency
  - Nitrogen, disease and pesticide use
  - Harvest date influence on nutrition needs, e.g. early crop removal
- Measuring Soil Mineral N
  - Sampling procedures and transport of samples
  - Interpretation of SMN reports
- The concept of “Nmax”
  - Calculation (as distinct from crop requirement)
- Carbon footprint of nitrogen fertilisers and the reduction of emissions of other associated N gases

## Module 2 – Managing farm phosphorus

The future uncertainty over fertiliser input prices and the precise relationship at a local level between rates of nitrogen and phosphate applied to land, and the quality of water in associated water bodies, will be the subject of the food security versus environment debate. The solutions will no doubt lie in the balance and land managed in a more integrated and sustainable way. More soils will need to be at their target index and field balance calculations will be necessary. Advice and tools to help achieve this are required. Phosphate regulations already exist in Northern Ireland, the rest of the United Kingdom seeks to address the issues by a more targeted approach.

### Matching phosphorus inputs with crop or plant requirements

- Forms of phosphorus in soils and their availability
- Nutrient requirement of the crop and application techniques
- Uptake in relation to the growth of the crop
- Forms of phosphate fertiliser and their availability

### Phosphorus in water

- The Water Framework Directive
- Pathways for phosphorus entry to watercourses
- How to reduce the risk of phosphorus loss from soils
- A planned approach to improvement

### The concept of a Phosphorus Balance

- Case study undertaking a phosphorus balance

### Module 3 – Techniques for in-field nutrient management

The need for widespread uptake of the basic crop management techniques, as well as new technologies, more sophisticated tools of the trade and professional abilities becomes obvious when one considers the challenges ahead for increased nutrient efficiencies and environmental protection. This module seeks to outline the next generation of possibilities in terms of tools and processes for nutrient management planning. Advanced training may be required to pursue some of the detail.

The use of soil sampling techniques, GPS, remote sensing and precision farming for nutrient management.

- Routine soil sampling techniques for P, K, Mg and pH
- Tissue and sap testing
- Overview of GPS/GIS. How GPS and GIS works
- Illustration of soil sampling
- Automated fertiliser application systems
- Fertiliser application tools using in-field data e.g.
  - Satellite imagery
  - Aerial photography with digital cameras & remote controlled aircraft
  - Farm machinery-mounted sensors
  - Crop reflectance and soil nutrient maps

## Module 4 – Efficient use of organic manures

There are sound reasons for driving the better use of available nutrient resources in organic manures (livestock manure, compost, sewage sludge etc) which are safe to use on land and can enhance soil quality. The legislative framework for activities is complex and non-compliance issues (with financial penalties) face the uninformed. Farmers and advisers need to be abreast of the wider issues of good practice. Not all of today's requirements are regulatory, there are many aspects which fall down to voluntary action with sound advice playing a key part.

### Utilisation and storage of organic manures

- Assessing the potential benefits of manure application
- Look-up tables (Fertiliser Manual or NVZ Guidance) - Understanding and interpretation
- Laboratory Analysis
- On-Farm Analysis
- Storage requirements

### Application techniques

- Field selection
- Timing
- Reducing nutrient losses with application techniques
- Rates of application
- How to prevent oversupply of a nutrient with organic manures
- Awareness of the potential negative effects from the use of other organic materials
  - Over-supply of nutrients
  - Imbalances between N and P
  - Potential heavy metals
  - Carbon/nitrogen ratios

### Impact on fertiliser advice. Using software to provide recommendations.

- Integrating manures into nutrient recommendations
- MANNER
- PLANET/other packages

## **Module 5 - Integration of nutrient management decisions with environmental regulations and policies, including nutrient planning and record keeping**

The means of conducting an integrated nutrient management plan and using it as a tool to annually review activities is seen to be central to achieving the objectives of sustainable farming. To demonstrate that this is so, accurate records will be needed, both because they are essential to the process of planning and to demonstrate good practice. Use of computer data capture systems for nutrient planning and record-keeping will become increasingly important to the farmer. Regulations alone will not deliver the positive changes in nutrient management which are expected and demonstration of good nutrient management practices overall will be necessary.

Implications of NVZs for nutrient management, including:

- Calculation of available N in any organic manures - if applied
- Calculation of crop nitrogen requirement
- Record keeping

## Module 6 - Fertiliser Industry Assurance Scheme (FIAS) and farm security

In 2004, the UK Fertiliser Industry was given the remit by Government to address fertiliser security and traceability concerns to reduce the potential of fertiliser materials being purchased by anyone but responsible users. Hence, the emergence of a self-governing industry assurance scheme (FIAS - the Fertiliser Industry Assurance Scheme). While the Scheme's reach is to the farm gate - not within it, there are some elements of the Scheme requirements which require a duty of care by the farmer and the FQA. These should be known and put into action in order for the fertiliser supplier to be confident that the user/customer carries due responsibility for fertiliser products whilst they are stored and used on farm.

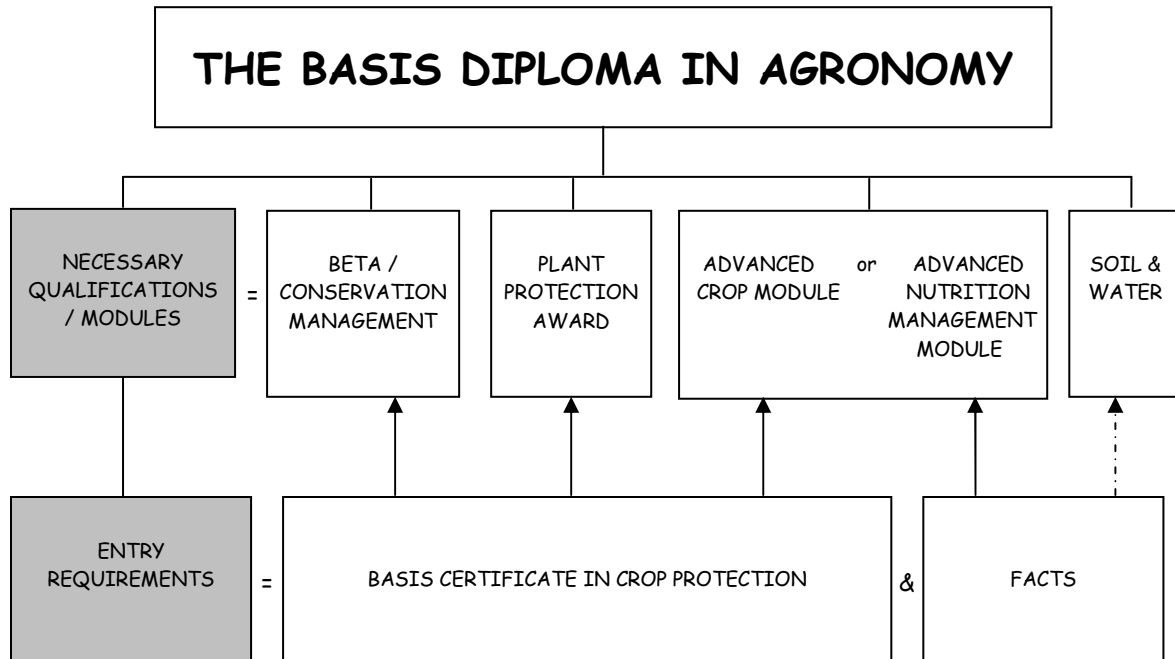
FIAS covers the assurance of all fertilisers intended for agriculture, horticulture, forestry, amenity and any other such commercial use. (It does not apply to fertilisers packaged for home garden use). Eventually, it will be difficult for farmers to source product from a non-FIAS fertiliser supplier.

The purpose and scope of FIAS and the importance of fertiliser security on farm.

- Ten Point code for Fertiliser Security (NaCTSO) for farmers and review of farm storage and transport regulations
- Assures compliance with ;
  - legislation
  - security
  - traceability
  - safety
  - good practice
- Separate standards for
  - manufacture
  - merchanting
  - transport
  - storage

## THE BASIS DIPLOMA IN AGRONOMY

The breadth and scope of knowledge needed for crop protection sales and advice grows every year. New products, new techniques and the way that crop protection fits with other farm and crop management activities all add to the skills needed by those involved in sales and advice for Crop Protection. To cover the range of factors involved, the new BASIS Diploma in Agronomy, as set out below, gives a comprehensive training and qualification framework for those involved in on-farm advice and sales.



### TOPICS COVERED

**ADVANCED CROP MODULE / ADVANCED NUTRITION MANAGEMENT MODULE** Weed, Pest & Disease Control, Crop Protection Programmes, Marketing, Food Industries, Crop Assurance, Nutrient Management

**BETA / CONSERVATION MANAGEMENT** Environment, Biodiversity, EIS's, CPMP's, ICM, Climate Change

**PLANT PROTECTION AWARD (PPA)** Systems & Society, Formulation, Mode of Action, Application, Health & Safety

**SOIL & WATER MANAGEMENT** Cultivation Types and Properties, Cropping Systems, Water Quality, Drainage, Pollution/Waste, Plant Nutrition

For the PPA and the Advanced Crop Module the prior achievement (by examination, exemption or validated certificate) of the BASIS Certificate in Crop Protection is an entry requirement. For the Advanced Nutrient Management Module the prior achievement of the FACTS qualification is required.

The FACTS qualification is a requirement for successful completion of the BASIS Diploma

and strongly recommended for those wishing to train for the Soil and Water Management certificate.

Prior qualification of the BASIS Certificate in Crop Protection (or exemption or validated certificate) or the Crop Protection Management and / or POWER Certificates are required for the BETA examination. In some circumstances, it may be possible for other types of prior qualification to be taken into account for BETA examination eligibility. BASIS Approved Trainers must be assured that in such cases, the prospective candidate is capable of assimilating the knowledge imparted during the BETA course tuition and also capable of passing the BETA examination.

It is **strongly** recommended that candidates should have had at least two years experience of on-farm practical agronomy before attempting any of the modules which contribute towards the BASIS Diploma in Agronomy, but in particular before taking the Plant Protection Award.

BASIS CPD points are available for training and certification in all modules of the BASIS Diploma.

The accreditation process for our qualifications has enabled BASIS to demonstrate a high standard of training and certification for our BASIS courses. The BASIS Diploma comprises a number of modules and 6 are required to complete the qualification.

A further consequence of accreditation by HAUC and the Higher Education qualifications framework has been the development by HAUC of a Graduate Diploma in Agronomy with Environmental Management.

BASIS courses have all been awarded a number of credits based on the time spent on the course (Targeted Learning Hours). This is a recognised formula including face to face tuition time, research, reading and experiential learning. The credits are awarded at a level that reflects the intensity / difficulty of the learning materials, for example A-level equivalent or 1st, 2nd or final year honours degree etc.

The qualifying BASIS courses with credits and levels awarded are shown below:

<b>FACTS</b>	
<b>Credit Value</b>	15
<b>Level</b>	Intermediate

<b>SOIL &amp; WATER MANAGEMENT</b>	
<b>Credit Value</b>	15
<b>Level</b>	Honours

<b>BASIS CROP PROTECTION</b>	
<b>Credit Value</b>	30

<b>Level</b>	Honours
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<b>BASIS PLANT PROTECTION AWARD</b>	
<b>Credit Value</b>	15
<b>Level</b>	Honours

<b>BASIS ADVANCED MODULES / ADVANCED NUTRIENT MANAGEMENT MODULE</b>	
<b>Credit Value</b>	15
<b>Level</b>	Honours

<b>BETA / CONSERVATION MANAGEMENT</b>	
<b>Credit Value</b>	15
<b>Level</b>	Intermediate

Intermediate = 2<sup>nd</sup> or 3<sup>rd</sup> year of university degree qualification.

Honours level - final year university degree.

Eg. FACTS 15 credits = 150 hours notional teaching time

The six modules required for the BASIS Diploma add up to 105 credits. In order to qualify for the HAUC Graduate Diploma in Agronomy with Environmental Management, candidates will need to accumulate 120 credits (ie one extra 15 credit module in addition to the BASIS Diploma). This can be any of the Advanced Crop Modules or the new Nutrient Management Planning qualification, available from September 2009.

Further details of the BASIS Diploma in Agronomy can be obtained from the BASIS office training department on 01335 340857 or 01335 340854 or by e-mail to [training.courses@basis-reg.co.uk](mailto:training.courses@basis-reg.co.uk)

## Useful Background Reading Sources

### **Precision Farming**

Introduction to Precision Farming

[pubs.caes.uga.edu/caespubs/pubs/PDF/B1186.pdf](https://pubs.caes.uga.edu/caespubs/pubs/PDF/B1186.pdf)

Precision Farming Primer - Introduction

<http://www.innovativegis.com/basis/pfprimer/Intro/introduction.htm>

HGCA research publications

Company (eg YARA, Masstock) Literature

### **Phosphorus**

[Understanding Phosphorus and its Use in Agriculture](#)

<http://www.efma.org>

Phosphorus in Agriculture and in Relation to Water Quality

[http://www.agindustries.org.uk/document.aspx?fn=load&media\\_id=2149&publicationId=348](http://www.agindustries.org.uk/document.aspx?fn=load&media_id=2149&publicationId=348)

### **FIAS and Transport and Storage**

FIAS Documents

<http://www.agindustries.org.uk/content.output/398/398/Trade%20Assurance/Trade%20Assurance%20Schemes/FIAS.msp>

Storage and safe handling of AN

<http://www.hse.gov.uk/pubns/indg230.pdf>

EFMA [Code of Best Agricultural Practice: Nitrogen](#)

EFMA [Code of Best Agricultural Practice: UREA](#)

EFMA Guidance For safe and Secure Storage of Fertilizers on Farms

<http://www.efma.org>

ADR regulations (the complete thing is here - take your pick)

<http://www.hse.gov.uk/cdg/manual/adrcarriage.htm>

### **Legislation/ Guidance relating to fertiliser usage**

The European Fertilizer Manufacturers' Position on the Revision of the Ground Water Directive

EFMA's Position on the Revision of the Ground Water Directive

<http://www.efma.org>

NVZ Booklets (1-9)

<http://www.defra.gov.uk/environment/quality/water/waterquality/diffuse/nitrate/help-for-farmers.htm#nvzs>

Protecting our Water, Soil and Air (Code of Good Agricultural Practice)

<http://www.defra.gov.uk/foodfarm/landmanage/cogap/documents/cogap090202.pdf>

Various documents relating to Water Framework Directive introduction in UK

<http://www.wfduk.org/>

<http://www.environment-agency.gov.uk/research/planning/33106.aspx>

Groundwater regulations

<http://www.netregs.gov.uk/netregs/legislation/future/97530.aspx>

Agri Environment Schemes

<http://www.rpa.gov.uk/rpa/index.nsf/categories/rpa%20schemes?opendocument>

<http://www.naturalengland.gov.uk/ourwork/farming/funding/es/els/default.aspx>

<http://www.naturalengland.gov.uk/ourwork/farming/funding/es/hls/default.aspx>

**NOTE - It is NOT recommended that you print off all of these files**

## BASIS APPROVED TRAINERS

The following Colleges, Trainers and Training Providers are successfully running Nutrient Management Planning examinations and have been accepted as BASIS Approved Trainers for Nutrient Management Planning.

**DJL Agronomics**  
Highgrove House  
Cassbrook Drive  
Fulstow  
LOUTH  
LN11 0XR

Contact / Trainer: Dr Jim Lewis  
Tel: 01507 363698  
Email: [jim.lewis@fsmail.net](mailto:jim.lewis@fsmail.net)  
Web: [www.djlag.co.uk](http://www.djlag.co.uk)

**Harper Adams University College**  
Edgmond  
NEWPORT  
Shropshire  
TF10 8NB

Contact: Lisa Chapman  
Trainer: Keith Chaney  
Tel: 01952 815300  
Email: [lchapman@harper-adams.ac.uk](mailto:lchapman@harper-adams.ac.uk)  
Web: [www.harper-adams.ac.uk/shortcourses/](http://www.harper-adams.ac.uk/shortcourses/)

**James Christian-Ilett**  
8 Painshall Close  
Welton  
Lincoln  
Lincolnshire  
LN2 3NU

Contact / Trainer: James Christian-Ilett  
Tel: 01673 860925  
Email: [Christian.ilett@btinternet.com](mailto:Christian.ilett@btinternet.com)

The following Colleges, Trainers and Training Organisations have expressed an interest in running some, or all, of the training modules and / or the Nutrient Management Planning Examination.

9 July 2010