European Network for Rural Development

Finding solutions to control AECM support for input reductions

One type of operation funded under the agri-environment-climate Measure (AECM) is support for reducing inputs on farms, which can focus on the reduction of (mineral) fertilisers, pesticides, herbicides or livestock densities. Input reduction is supported generally as a means of enhancing water and air quality as well as maintaining and improving biodiversity.

Input reduction operations can be designed in two different ways:

a) full reduction, where no (mineral) fertiliser and/or pesticide/ herbicide use is permitted; and
b) partial reductions, where inputs must be reduced in comparison to conventional or former farming practices.

Looking at the criteria for the design of an "ideal AECM" (Box 1), the design of support to encourage input reduction might be challenging to ensure that all these criteria are respected. It may be that such support has: clear objectives; sufficient evidence for the effects of input reduction on the environment, reductions that go beyond mandatory standards; and operations that are well targeted to areas of special need, e.g. the measure can be offered in areas with a poor water quality where inputs are shown to be the cause of the problem. However, even in such cases, there remains an important problem with control and verification of such operations.

In particular, partial reductions pose controllability problems as it is difficult to demonstrate by how much the use of mineral input has been reduced. This has led to a recommendation that operations are preferred which are designed to require no input use, since this is easier to verify.

In the following sections, two examples are provided of how AECM support for input reduction has been designed under the European Agricultural Fund for Rural Development (EAFRD), where the challenges of establishing a proper control system and making the results verifiable have been overcome.

Box 1: The "ideal AECM"

- ✓ Clear objectives
- ✓ Evidence based
- ✓ Clearly going beyond mandatory standards
- ✓ Targeted at specific problem / need and area
- ✓ ***Delivering clear results***
- ✓ ***Controllable and verifiable***

European Commission

The "Recommended fertiliser management system" in England

Under the English RDP, support options for input reduction range from a total ban of all kinds of fertilisers to a partial reduction of inputs. One important requirement associated with most of the input reduction options is the use of a "Recommended fertiliser management system". This enables an optimal fertiliser management plan to be elaborated for each farm and eligible site.

The plan should take into account: soil type; rainfall; field cropping; fertilising and manuring history; regular soil analysis for soil mineral nitrogen; pH, P, K and Mg nutrient balances - surplus or deficit from applications to previous crops; an assessment of available nutrients from organic manures; and crop tissue analysis where appropriate. Soil nutrient testing is used at the start and end of agreements to: check eligibility for the option; set a target nutrient level to be reached; and then to measure progress against the target.

Where soil nutrition testing is not reliable, e.g. in fens or coastal areas, fertiliser record checking and field inspections are used to ascertain whether the prescriptions were being followed.

The farmer receives – if necessary – external advice on how to apply the system and develop a plan. This approach allows the operations under the AECM to be targeted in the most appropriate way, for example for biodiversity in areas of high nature value or for water quality in areas where this is an issue. For some measures, the advisory service is obligatory to ensure a proper use of the Fertiliser Management System. Advice to farmers comes from a number of sources: private, commercial and governmental ones. A publicly funded external advisory service has been set up through public procurement under EAFRD Measure 2 (Advisory services).

Payment calculation

Payments to farmers are calculated for each farm individually based on general payment rates under the AECM for different types of input reduction, which are applied parcel- or farm-wise. In the calculation, the savings for fertiliser not purchased have to be taken into account. For instance, for a scheme "Permanent grassland with very low inputs", the following main management and economic implications are considered when calculating the general payment rates for input reduction operations: reduction in stocking rate; extra weed control; savings in forage costs; and additional time managing historic features (for details see Table 1).

Demands on the farmer

- Agreement holders following a ***fertiliser management system*** are required to hold records and documentation to show that they are following the system at a ***whole-farm*** level;
- Agreement holders are required to keep input records for the areas under the agreement setting out ***quantity***, ***type*** and the ***timing*** of input use.

Requirements related to controls

- Soil nutrient tests to check progress against the input-reduction target agreed;
- Administrative and IT checks (where activities can be checked against external data sources, an administrative check will be carried out)
- Delivery body advisers visit the sites of all "Higher Tier agreements", i.e. under those where it is complied with stricter requirements, once during the lifetime of the agreement to check understanding of the requirements and that the agreement holder has undertaken appropriate management of the site;
- Inspectors are required to:
    - Visit all parcels and make a visual check of the condition of the land to assess whether it is consistent with the required level of inputs;
    - Annotate maps for relevant parcels or part-parcels where the agreement contains low-input requirements;
    - Annotate no inputs used if visual check suggests that they have not been used (including notes on correspondence with seasonal patterns and farming cycle);
    - Record any concerns about input levels in the inspection report;
    - Check relevant ***input records*** and ***fertiliser management records***;
    - Check independent soil sampling has been carried out at the beginning of agreement and at end, where appropriate;
    - Check ***external advice*** has been provided on the use of a fertiliser management system and / or a follow-up meeting has taken place with appropriate documentation retained from adviser visits;
    - Quantity check of inorganic and organic input products where a concern about usage is found.
- For participants in certain schemes, the quality and depth of the external advice will be controlled, i.e. whether the beneficiaries have received sufficient information and advice to implement the fertiliser management plan profoundly ("Over control").
- Inspections will be timed where possible to take place during the period in which the commitment must be met – any inspections outside this period must confirm that the condition of the area is consistent with the management records;
- Sampling and analysis will be carried out where it can help confirm that the option has been managed correctly;
- Penalty system is proportionate and takes account of the severity, extent, duration and reoccurrence of any non-compliance.

Table 1 : Example of payment calculation for a scheme on permanent grassland with very low inputs - Calculation of Income Foregone (and additional costs)

	Losses £/ha	Gains £/ha	Assumption which are backed with supplementary calculations
Extra Income			
Gross margin @ 0.5 GLU/ha		185	*Assuming that under AECM land is grazed at 0.5 livestock units per ha*
Sub-total		***185****	*Gross margin under AECM management*
Costs Saved			*Costs not incurred under AECM*
Forage costs		161	*Costs arising from the additional land needed to provide forage for grazing animals during non-grazing period. Reduced stocking means less forage required.*
Interest of working capital of forage		3	*Savings on interest otherwise arising from capital costs of forage – less forage therefore less interest.*
Interest of working capital of stock		32	*Savings on interest otherwise arising from capital cost of livestock – less livestock therefore less interest*
Sub-total		***196***	*Costs saved as a result of participating in AECM*
Income Lost			
Gross margin @ 1 GLU per ha	427		*Typical gross margin before participation in G2. Effectively this gross margin will be replaced by gross margin arising from participation in AECM.*
Sub-total	***427***		
Extra Costs			*Additional costs arising from participation in AECM*
Interest on working capital of stock	15		*Interest on capital for livestock needed to graze AECM*
Weed control on 30% area	14		*Explained in supplementary calculation sheets*
Extra time to protect historic features (2 hr per ha per yr @ £9.92/hr)	20		
Sub- total	***49***		
Total	***476***	***381***	
Income Change	**95**		*Change in income foregone and additional costs for AECM compared with typical costs*

Note: GLU = Grazing Livestock Unit

Source: Based on the payment calculations submitted with the English RDP

Advantages of the approach:

- Options can be targeted at sites which are of greatest environmental priority;
- The type of input reduction can be adapted to the situation on a given parcel.

Disadvantages of the approach:

- Agreement holders are required to keep and make available detailed records of their management of the areas.
- These types of operations require a high control effort for the administration.

Lessons learnt:

Advisory services are essential for ensuring the effective implementation of measures to support input reduction.

The "Indicator of frequency of treatment (IFT)" tool in France

In France, several AECM operations aim to reduce the use of pesticides. In 2006, the Indicator of Frequency of Treatment (IFT) was developed by the French Ministry of Agriculture and the National Institute for Agricultural Research (INRA) as a means of measuring the use of pesticides on farms and its evolution over time.

The calculation of the IFT is based on the amount of pesticides actually applied by the farmers on their agricultural plots. For each pesticide type, a standard dose in litre / ha is defined, according to the product's marketing authorisation. All treatments applied to one agricultural plot over the year are added together and divided by the standard dose to calculate the average IFT per ha at the farm level:

$$IFT = \frac{dose\ used\ by\ the\ farmer}{standard\ dose}$$

***= 1** if the farmer has used the product according to the standard dose*

Farmers in certain areas are eligible for AECM support to encourage input reduction. At sub-regional level, an average IFT value is calculated for each crop. This is then developed into a reference value for each local area according to the proportion of each type of crop within the area. Within an AECM agreement, farmers have to move towards a lower IFT over five years. The maximum IFT reference value reduces over time and farmers must reduce their on-farm use of herbicides and pesticides by the proportion identified each year, with the local IFT reference value acting as the absolute maximum which must not be exceeded (see Table 2).

Table 2 : Example of IFT reduction at farm level

	% of reduction / IFT of reference	Max value of IFT
2016	No reduction required in 1st year	
2017	20 %	1,6
2018	25 %	1,5
2019	30 %	1,4
2020	40 %	1,2
Premium	85 €/ha/year	

Requirements for farmers in an AECM commitment on input reduction in a region with an average IFT of 2: Farmers must reduce their pesticide use step by step.

Payment calculation

The premium of the AECM is differentiated according to the requirement of the individual AECM commitment. There are different payment rates for different levels of reductions and types of reduction.

Demands on farmer

- Farmers have to record all the treatments applied on crops (including date of treatment, product used and dose).
- An online calculator is provided by the Ministry of Agriculture to help to calculate the value of the IFT.

Requirements related to controls

- IFT-related commitments are checked on-the-spot
- The IFT of the farm is calculated on the basis of the records
- Consistency of the records is verified with:
  - Purchase invoices of phytosanitary products
  - Stocks of phytosanitary products that have not been used yet on the farm

Advantages

- The IFT measures the amount of pesticides actually used in practice by the farmer on his farm.
- The concept of the IFT allows for commitments to be designed which lead to a progressive reduction of the use of pesticides (annual decrease).
- The IFT is calculated on the basis of documents that farmers must complete anyway for compliance with the regulation on pesticides (record of the pesticides used on crops).

Disadvantages

- The use of this indicator requires a good understanding of the calculation method by the farmers.
- Weather conditions have an impact on the use of pesticides and its current form, whereas the IFT is not flexible to be adapted to a particularly dry or wet year – for this reason variable weather conditions have to be taken into account when calculating the maximum IFT value for a particular area.

Lessons learnt

Training of farmers is important for the effective implementation of the measure.

Box 2: Important conclusions from both examples to input reduction

Controlling and verifying payments for partial input reduction is possible!	***The provision of advice and support via advisory services is often quoted as being essential for the successful implementation of input reduction measures!***

The auditors' experiences with support to input reduction

- The most common control methods to check input reductions are:
  - Parcel diary (best if plot-wise) + checks on stored substances + checks on invoices + bookkeeping + inspection of the premises;
  - Visual checks with the aid of a checklist and expertise of the inspectors (in the relevant periods); and
  - Chemical/ soil/ plant analysis
- None of the [commonly applied] control methods is likely to provide complete assurance that the operation has been correctly implemented on its own, but they can be effective as a combination (see Table 3).
- It is important to assess the amount of pesticides in the groundwater when a commitment starts (the baseline) and at the end of the commitment (after 5 years) to assess the results and the achievement of objectives.
- Whether a "part-of-the-farm-approach" to controls can be applied has to be assessed on a case-by-case basis
- Appropriate training for inspectors is essential, especially for ensuring that control methods are applied consistently.

None of the control methods is likely to provide complete assurance of correct implementation on its own, but their effectiveness can increase significantly when they are combined.

Table 3: Overview of combination of methods for controlling different schemes supporting input reduction

Controls Support schemes	Parcel diary	Visual checks	Chemical/ soil/ plant analysis	Other control mechanisms	Challenges Points to look at
Ban on fertilisation (manure spreading) during winter	X	X *Only OTSC*		- Checks on stored substances + checks on invoices + bookkeeping - Additional (targeted) sample for winter commitments	Visual inspection will provide conclusive evidence for the day of the visit, and for the period before the visit, but not for the period after the visit.
Ban on growth regulators or pesticides	X	X *only OTSC*	X	Checks on stored substances + checks on invoices + bookkeeping	Plant or soil analysis may not be effective for substances with fast degradability.
Uncultivated buffer strips along water courses		X	(X) *in case of doubts after the visual checks*	Screen review with the Land Parcel Identification System (LPIS)/Geographical Information System (GIS) (remote sensing)	
Maximum livestock density (LU/ha)		X *+ counting of the animals or proxy method for calculating if there are issues of practicability* *(OTSC)*		- Cross check with animal database - Checks against animal registers where no databases are available (e.g. Breeding organization registers) - Administrative calculation of the livestock density - Check and matching of animal 'passports' (OTSC)	Use of animal data base and register might be misleading if max. LU/ha is fixed for specific area, not entire holding.
Organic farming on part of holding		X	X	Evidence from other extensification-related checks, e.g. visual inspection on the absence of forbidden inputs on the holding (OTSC) Certificates issued by accredited control bodies for Organic farming	Inputs banned under organic rules may be used on the non-contracted area and be found on the holding Possible contamination from non-organic areas

Note: OTSC = On the spot check

References

For the draft of this Fact sheet, formula and the tables have been taken from the Power-Point contributions provided at the above mentioned workshop; the presentations are published on the ENRD website. For the

French example (formula and mini table), see http://enrd.ec.europa.eu/sites/enrd/files/w12_inputreduction_fr_dominiak.pdf

for Table 1, see , http://enrd.ec.europa.eu/sites/enrd/files/w12_inputreduction_audit_lago.pdf

Photo: https://www.umweltbundesamt.de/themen/boden-landwirtschaft/umweltbelastungen-der-landwirtschaft/pflanzenschutzmittel-in-der-landwirtschaft Last accessed: 11.01.2017.