Nutrient Budgeting and Management on Organic Farms

James McDonnell, Teagasc Oak Park

Mark Plunkett, Teagasc Johnstown Castle.

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Soil Sampling

- Find the baseline
- Soil sample every 3 - 5 years
- Take samples correctly
- Sample every 4ha or where similar soil type / rotation increase to 8ha
- Cheap @ €1.25/ha/yr
- Base nutrient advice on results

Organic Nutrient Law

“Feed the soil to feed the plant”

Soil pH

Crop	Optimum Soil pH
Grass	6.3
Grass *(Max. on high molybdenum soils)*	6.2
Clover	7.0
Cereals	6.5
Beet, Beans, Peas, Oilseed Rape	7.0
Potatoes	6.0

Note: Optimum pH for peat soils pH 5.5.
Source:- Teagasc, 2008

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Nutrient Management (P and K)

- No nutrient inputs being used on many organic farms
- High nutrient outputs in
  - Milk
  - Meat
  - Grain
  - Vegetables
- Unsustainable system

P & K off takes in cereal crops (kg/ha) per tonne of grain yield

	Straw Removed		Straw not removed	
Crop	**P**	**K**	**P**	**K**
W. Wheat / Barley	3.8	9.8	3.4	4.7
S. Wheat / Barley	3.8	11.4	3.4	4.7
Oats	3.8	14.4	3.4	4.7

Source:- Teagasc, 2008

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P & K off takes in crops kg/ton fresh weight

Crop	Yield/ha	P	K
Potatoes	36	0.6	4.9
Cabbage	30	0.4	10
Carrots	36	0.3	8.3
Swede	30	0.4	9.1
Source:- IOTA, 2010			

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Nutrient content of various farm products (P & K)

Product (per ton)	P (kg)	K (kg)
Milk	1	1 – 2
Meat (beef)	10	2
Meat (lamb)	6	1.8
Meat (Pig)	1.8	2.9
Grain 1000kgs	3.4	4.7
(Source:- IOTA 2010)		

Sources of Nutrients

- Straw
- Feed
- Seed
- Organically approved fertilisers
- Organic Fertilisers (compost, slurry & FYM)

Total Nutrient Content & Value (€) of Organic Manures 2010

Organic Manure Type	Total N kg/m³ /ton	Available N kg/m³ /ton[1]	P kg/ m³ /ton	K kg/ m³ /ton	Value €/ m³ /ton
Cattle Slurry	5.0	0.7	0.8	4.3	**6.6**
Dungstead Manure	3.5	1.4	0.9	4.2	**7.50**
Farmyard Manure	4.5	1.35	1.2	6.0	**9.80**

[1] Manure values are calculated based on available N & total P & K. Value of N = €1.27c/kg. P = €1.72/kg, K = €1.00c/kg (Nutrient values based on price of range of fertiliser products)

Case Study

- 50 ha good mineral soil
  - 25 ha grassland
    - 18 Cows + Bull
    - 18 Calves
    - 18 Finishing cattle
  - 25 ha crops
    - Oats
    - Triticale

Crop Rotation

Year 1 – 3	Grass/ Clover
Year 4	Winter Oats
Year 5	Winter Triticale
Year 6	Winter Oats

Nutrient flows on case study farm

Nutrient source	Out Flow	In Flow	Remains on farm
37 tons grain produced	27 tons		10 tons
18 cattle sold each year	18 cattle		
Straw		65 bales	135 bales
Silage			330 bales
Seed		5.5 tons	

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P Budget

Nutrient	Outflow (P)	Inflow (P)
Meat	100	
Grain	92	
Straw*		6.9
Grain seed		18.7
Total	**192**	**25.6**

*0.69kgs P per ton fresh straw

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K Budget

Nutrient	Outflow (K)	Inflow (K)
Meat	200	
Grain	127	
Straw*		96
Total	327	96

* 9.6kgs K per fresh ton straw

Replacing nutrients - options on the case study farm

	P (kg)	K (kg)	Cost €
Budget summary	-166	-231	
FYM (import 139 tons)	+166	+834	0 - 1362
Slurry (import 208m^{3}cattle slurry)	+166	+894	0 - 1373
Potassium Sulphate (e.g. Patentkali®)*	0	+231	855
Ground Rock Phosphate (GRP-12%P)*	+166		485

*prices subject to change, order size and location.

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Take Home Message

- Management
  - Measurements and soil samples
- Budgeting
  - Inflows and Outflows
- Replace lost nutrients
  - The long game

Thank You For Your Attention

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