A FARMER'S PERSPECTIVE ON BIODIVERSITY, EMISSIONS AND WATER QUALITY

A warts and all look

Quick intro – who am I, where we farm, our farming 'philosophy'

• Thomas Duffy, former President of Macra na Feirme

- Farming in partnership with my father Ned and mother Kathleen in East Cavan
 - The farm;
 - 51ha (125ac) owned fragmented into 3 blocks with no block being larger than 20ha (50ac)
 - Grazing block is the largest, 20ha with 6ha rented
 - 105 cows milking all spring calving, predominately Holstein Friesian with some xbreds
- Our Philosophy Reduce waste first 'Wilful waste brings woeful want'
 - Pollution is EXPENSIVE every kg of N lost to water, or kg of methane produced is fertiliser or feed you both

			•									v & Calving data based on HerdPlus 2020 Calving Penort	
												a calving data based on herdrids 2020 calving Report	
												Interval (days)	
1. Productio	n Sumr	naries - \	Valid L	actatio	ns							number of days between successive 384 402 367	62% * * * *
Only animals th	hat have	had a vali	d lactati	on are ir	ncluded	in thes	e summ	aries. A val	lid lactation is	s one		for cows calved during the period	
that: (i) was co	mpleted	on the far	m during	g the 12	month	period (ii) is clo	sed (has dr	ry off date in	2020)		6 Week Calving Rate	70% + + + +
with over 150 d	days in m	nilk or is st	till in mil	k and ha	ad a tes	t on or	after 305	days in 20	20.			of cows/heifers calved within the first 6 wks (78) 70% 50% 03%	79% ****
Group	No. of	Average			Com	pleted La	ctations (Only			Milk Value	Income Sine and Calving Survey recorded	
Gioup	cows	milk	MKg	M Gall	F%	P%	F Kg	P Kg	F+P Kg	SCC	FBI	known Sire and Calving Survey recorded	1000
												where sire (105) and calving survey (105) are 100% 62% 100%	100% * * * * *
Overall	83	267	6149	1314	4.01	3.49	247	215	462	114	€2094	as a proportion of all births during the period (105)	
		305 CI: 384	0007	1407	4.07	3.53	200	233	500		€143	ed replacements	
date a station	10	050	4404	050	4.07	0.55	400	450	0.10		CAREER	orn in the period from dairy AI (15) 100% 54% 100%	100% * * * * *
1st Lactation	19	305	5089	1087	4.07	3.55	212	159	342	81	€1557	portion of dairy females born (15)	
											€146	eifers Calved at 22-26 months	400/
2nd Lactation	12	276	5993	1280	4.19	3.64	251	218	470	60	€2140	eifers calved (13) that were between 22 & 26 05% 50% 100%	49% * * *
		305 CI: 351	6291	1344	4.25	3.68	267	231	499		£165	of age (20)	
3rd Lactation	4	272	6809	1455	3.66	3.42	249	233	482	114	€2195	tistics based on the latest HerdPlus EBI report 2021	
		305	7298	1559	3.73	3.45	272	252	524			BI (2021)	
At Lastation	40	CI: 438	6700	1451	3.00	2.45	074	224	505	124	€144	EBI for Cows (104) €139 €107 €158	77% * * * *
4+ Lactation	40	305	7195	1537	4.03	3.48	290	254	540	134	22200	data	
		CI: 388									€137	2021 Insemina Show Period Full Year Y Evolute If Measured Less 1	han 12 🗸
Winter												d Average EBI d 08/01/2020 To 20/12/2020 (3/7 Days) (i) Sorted By: Code Ascer	ding
												d in Spring 20/	ung Worago 11 10 Toppo/Ha
													werage 11.15 ronnenna
Spring	83	267	6149	1314	4.01	3.49	247	215	462	114	€2094	14 - 33 33 - 33 - 33	
		CI: 384				0.00	200	200			€143	13 - 33 - 33 - 33 - 33 - 33 - 33 - 33 -	19
													28 28 28 20
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												7	
												7	

Why these elements matter







EMISSIONS: GHG – CLIMATE CAUSING GASES (CC) VS AMMONIA GAS – LOCAL EFFECTS TO PLANTS/ECOSYSTEMS

(AM)

WATER QUALITY: SURFACE WATERS – RIVERS/LAKES/SEA GROUND WATER – WATER FOR BOTH PEOPLE AND LIVESTOCK HIGH NITRATES LEVELS – ALGAE BLOOMS HIGH PHOSPHORUS/ LEVELS

(WQ)

BIODIVERSITY:

LOSS OF SPECIES UNBALANCES THE SYSTEMS WE RELY ON –

HOODED CROW POPULATIONS HAVE GROWN 40%+ SINCE 1998 DUE TO HABITAT CHANGE AND LOSS OF BIRDS OF PREY

(BIO)

Why this really matter



Quick intro – terminology

• Gases:

- Ammonia not a GHG, other issues
- Methane belched by cattle/sheep, released by slurry and from dung heaps
- Nitrous Oxide powerful climate warming (276 times carbon dioxide) released from manure/fertiliser
- Carbon dioxide mostly before the farm gate, drained peat as a major source though
- Can carbon sequestration save us?
 - NO, can help but big uncertainty around soils and VERY complicated global political matter
 - Net increase in hedgerow, new hedges or bigger hedges, existing hedges wont count

Facts – both entirely accurate and true but only represent one side of conversation

• What 'we' say

What 'they' say

- Ireland has the lowest emissions per litre of milk in the EU agriculture, 4th lowest in beef
- Ireland has the second highest water quality in EU (after only Austria)
- Ireland has above EU area of habitat on farms at 13% (vs 2.1% in Netherlands)

Ireland has the highest % of national emissions in agricultural at 35% and growing

Farming is the largest pressure on water quality with declines in most categories

Farmland Birds are declining, some species by 50% due to habitat loss





Not all changes are equal

- Easy wins/simple to reduce or replace
 - Protected urea straight swap for urea, small changes to CAN use (Am)
 - Low Emission slurry spreading either purchase or contractor change (Am & CC)
 - Liming (CC)
 - Improve beef value of dairy beef stock high DBI or Terminal bull (CC)
 - Improving hedgerow management A shape (CC & Bio)
 - Milk recording or cattle weighing and culling lowest performers/ensuring they don't breed (CC & Am)
 - Increasing longevity of cows & reducing involuntary culling – health improvements (CC)

- Smaller changes/investments needed
 - Sexed semen need good heat management(CC)
 - Clover incorporation at reseeding or overseeding (WQ & CC)
 - Upgrading fertiliser spreader (WQ & CC)
 - Tolerance of weeds or leaving aside areas (WQ, Bio & CC)
 - Red clover silage (Bio & CC)
 - Minimum tillage (CC)

- Bigger/costlier changes and investments
 - Renewable energy solar panels (CC)
 - Ponds or rewetting (WQ & Bio)
 - Covering all slurry tanks (CC & Am)
 - Recontouring farm road ways away from water sources (WQ)

Fertiliser – fertiliser doesn't grow grass. Sun, water and soil does, fertiliser helps only

- Largest source of non-methane emissions
- Largest source of water pollution
 - Point source leaking slurry tanks, livestock in streams, roadway runoff massive improvements here
 - \circ 'Diffuse' too much slurry too early, 'early nitrogen' when its cold and wet
- Heavy wet soils Nitrogen lost to air
- Dry sandy soils Nitrogen lost to water
- LOW USE OF NMP = a major barrier to good fertiliser management
 - Personal opinion: Compounds are not usable on farms following a NMP all straight P&K needed, 18.6.12 is a crutch
 - Ignore calendars, you don't feed a calf that's not eating and pile the feed in the through?



Once conditions are right, what do we need



Water quality reductions





Red clover/white clover



NMP Plan

						Split 1			Splet 2			ipiit 1	1	AJ S	phil 2	r	50	ster 3			star. 1	
F(0.8)	0.80 Grazing	101215.K	NPK	NPK 279.194	NPK 41	Fertiliser	Rate (kg/ba) 54.00	Amount KGs	Fertiliser	Rate	Fertiliser	Rate (kg/ha) KGs	Fortubser	Rate (kg/ha)	KGs	Fertiliser	Rate (kg/ha)	KGS	Fertiliser	Rate (Agiha)	- **
0.0	340 3044 0000		Contraction of			Protected		43.4	1		Protected	-		Protected	-	80	Tone Super P	90	4	Protected	100	
a(5.0)	5.00 2 Cut + Grazing	2 1/3/4	212 35 230	279-59	142	Cattle Slumy	3000.0 Gais/Acre		18mm (48% M) +	90.0 Kabla	Urea(48%N)	70	2280	Cattle Slurry	3000 Gals/Acre			M. Units		Ures (46%N) + Protected	150	
_				Section 1					Protected		7%5) + Protecter	- Horn	25	Tons Super P		250	148.23			Ures (46%N) + Protected	100	
1.90	0.90 Grazing	1/2/4	2/444195	279 290	0.0	10	-		1		Urms (46%N) + Protected	113 m	172 1982	Cattle Slurry	2500 Gals/Acre			1.1.10		Urea (40%N) + Protected	129	
01	3.00 2 Cut + Grazing	1/2/3	277 58 238	279 59 155	21	Cattle Siurry	3000.0 Gata/Acre		Sugar.	- and the	Ures (46%///) + Protected	10	13	10% Super P	150	135	Urea 46N	30	45	Urea (46%N) + Protected	160	
5.B)	3.80 Grazing	1/3/3	287 18 79	278 19	121	Cattle Sturry	2000.0 Gals/Acre				Protected Urea (46%N) +	100	80	Ures (38%N +	100	200	10% Super P	200	600	Ures (40%N) + Protected	150	
1)	0.80 Grazing	1 2 4	258.25.79	279 29 0	23.4	79 Urea (46%N) +	5.0		100.000	13000	Protected		30	7%S) + Protected		380	*	A		Protected		
	0.90 Graning	11214				Protected	/		1. 14		Protected		12	10% Super P	100	80		50	40	1	1000	
	USU Grazing	11214		219.28	204	Urea (46%N) + Protected	5500	49.8		C. States	Ures (48%N) + Protected	100	13	16% Super P	100	90	ST.	56	KE	-		
	0.80 Grazing	1 2 4	250 25 79	279.29.0	23.4	75 Urea (46%N) + Protected	55.00	44		1 A	Ures (46%N) + Protected	- 11	120	16% Super P	100	80		00	10	27.00		
	0.90 Grazing	1 2 4	256 25 79	279 29	23.4	Ures (46%N) +	5000	48.5			Ures (48%N) +		-	16% Super P	100	90		30	50			
,	0.90 Grazing	1 2 4	256 25 79	279 29.1	23.4	Urea (45%)	5560	-			Protected	40	99			50	10000	50	145			
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	2.10 Grang					Urea (40%N) + Protected	61.00	128.1		-	Ures (38%N + 7%S) + Protected	125	315	16% Super P	150	315	199 189	58	125		NOV STOR	
arLyn(1.E	1.80 2 Cut + Grazing	1 (3) 3	45 94 229	279-40 155	234	1		()		T	Cattle Slurry	2000.0 Galls/Acre	120	16% Super P	75	135		20	TUS	SONK (MOP)	150	
rnela(1)	1.50 2 Cut + Grazing	11214	218-400	279 590	81 19	0 Urea(46%N)	62.00	117.8	Control V	Managa	Urea (46%N) + Protected	150	285	16% Super P	150	285		and the second		Urea (40%N) +	150	
	1.00 TOUL COLLEG	11214	211-48.0	2/9490		0 Urea (46%N) + Protected	62.00	99.2			Urea (38%N + 7%S) + Protected	180	288	16% Super P	150	240	C. Contraction	1.71.57.19		Ures (45%N) + Protected	137	
randra(1	1.40 Grazing	1 2 4	272.26 2.96	279.29	73	Cattle Sturry	3000.0 Gala/Acre			100000	Urea (46%N) + Protected	100	140	Cattle Sharry	3000 Gale/Acre					Urma (46%N) +	100	
ack heid;	1.20 1 Cut + Grazing	1 2 4	279 44 238	279,49/0	05-22				Cattle Sturry	3000.0 Gals/Acre	Urea (38%N + 7%S) + Protected	140	168	Cattle Skurry	3000 Gala/Acre		-	CR. Correct		Protected Ures (46%N) +	100	
locik 2(0.1)	Grazing	11414	000	27000	279.0	9	CONTRACT.				I DESCRIPTION OF	ALC: NO.		And the second second	Conference of the second second			-		Protected		
(0,6)	Grazing	1 2 4	45,9,79	279 29 0	234,20-7	Cattle Siurry	2000.0 Gals/Acre				1.1							100				
	1.10 1 Cut + Grazing	1 4 4	226.00	279.00	420	Urea (46%N) + Protected	62.00	99.2			Urea (46%N) + Protected	150	240		Institute.					Urea (48%N) +	150	
						Protected	62.00	68.2			Urea (38%N + 7%S) + Protected	150	165							Urea (46%N) + Protected	150	
	1.20 Gruing	11414	270.00	279 0 0	0.0	1.1.1.1.1.1.1		0			Urea (38%N + 7%S) + Protected	150	180	Urea (46%N) + 4	100	120		-		Urea (46%N) +	150	
	0.70 Grazing	1 3 4	296.0.0	279 19.0	13 19/	Urea (46%N) + Protected	4100	42.7			Urea (48%N) +	125	1 80	Urea (48%.N)	122	00 1	-			Protected		
H	1.50 Grazing + Reseed	1 4 4	- 51038	279.0.30	228.01		- 1	0			Protected	-32	0	Protected	-	00.1				Protected	100	
	1.40 Grazing	1 3]4	252,810	279 19 0	27.115	Urea (46%N) + Protected	123.60	172.9		Contraction of the	Urea (38%N + 7%S) + Protected	150	210	16% Super P	50	70	17.0	-		-		
	0.70 Grazing	1 3 3	000	279 19 36	279 19 35	2 2/17				api it i	Religion of	-			-					Carrier States		
	0.90 Grazing	1 2 4	277.240	279:29:0	250	Ures (40%N) + Protected	61.00	54.9		S. 40. (S. 3)	Unes (38%N + 7%S) + Protected	150	105	Urea (38%N +	100	135	10% Super P	150	474	Ures (40%N) +		
1	2.50 Grazing	1 3 4	277 8 0	278 190	2110	Urea (48%N) +	5500	137.5			Ures (38%N +	- a		(%S) + Protected	150		1001 0 000 0		130	Protected	100	
-	0.80 Grazing	1 3 3	264-18 79	279 19	151.44	Linea (48%N) +	-		1. 1. 1.		7%S) + Protected	194	238	7%S) + Protected	120	375	10% Super P	- 50	-12!	Urea (46%N) + Protected	150	
alle.	170 0000					Protected	01.00	48.8			Urea (38%N + 7%S) + Protected	-	60	Urea(45%N)		60	CAUR	1000 100		Urea (48%N) + Protected	100	
	e.vo Grazing	11413	263 0 0	279 0:15	16035	Urea (46%N) + Protected	61.00	103.7			Ures (38%)		470	Urea (38%)	100	170	-			Ures (40%N) +	-	

The warts

- Complaints around Protected urea
- Lower 6week calving with more sexed semen
- No return from the market for these measures when not cost saving
- The failures/unknowns Multispecies Grasslands (huge potential but weed control a nightmare)
- Increasing droughts and flooding making adoption harder (ironically)

Multispecies



Space for nature



Genetics

- Most reliable way to reduce methane
- For dairy cows: longer life = lower lifetime emissions (carrying a 'overhead' of methane for her first 2 years)
 - Key factors
 - Improving EBI
 - Low INVOLUNTARY CULLING
 - Lower replacement rate (once not expanding)
 - More mature cows (3rd-5th lac)
 - Calving 22-26m
- For beef (dairy beef)
 - Key factors
 - Age at slaughter
 - Weight at slaughter
 - Sire more vital than

Lactation Summar

Lact.	Calved	Milk Ka	Fat Kg	Prot Kg	Fat%	Prot%	F+P Ka	SCC	Days	305d Milk Ka	305d Fat Kg	305d Prot Kg	305d Fat%	305d Prot%	305d F+P Ka
1	10 02 11	4026	212	164	4 20	2 20	276	40	270	5050	224	170	4.42	2.40	206
	18-02-11	4830	212	104	4.38	3.39	3/0	48	2/9	0000	224	172	4.43	3.40	390
2	23-01-12	6078	248	205	4.08	3.37	453	41	317	6007	245	203	4.08	3.37	448
3	11-02-13	7359	286	244	3.89	3.32	530	75	318	7230	279	239	3.86	3.31	518
4	17-02-14	6284	246	208	3.91	3.31	454	56	265	6706	267	223	3.97	3.33	490
5	10-02-15	7361	323	256	4.38	3.47	579	63	284	7660	338	267	4.41	3.49	605
6	26-01-16	8105	307	277	3.79	3.42	584	180	321	7967	300	272	3.77	3.41	572
7	12-02-17	9354	376	331	4.02	3.54	707	48	293	9557	386	338	4.04	3.54	724
8	06-02-18	7655	300	261	3.92	3.41	561	86	318	7474	292	Jumbo:	AA	1602	
9	25-02-19	7602	298	253	3.91	3.33	551	397	326	7317	285	Animal N	lumber: 3	- m.	
10	25-03-20	6543	234	216	3.58	3.30	450	73	269	6966	251	Sex:	MA	LE	
11	08-04-21	1147	43	40	3.78	3.50	83	172	32	7237	270	Date Of I	Birth: 23-	APR-2018	
Avg (Completed)	7118	283	242	3.99	3.39	525	107	299	7193	287	Animal N	lame: LIS	DUFF RED LE	NNY U602

Genotype available for animal, genotype included in evaluation

lacement/Terminal 🤇	Dairy Beef				
uro-star index Pedi	gree Weight I	Progeny Linear Scoring	Evaluation Histor	y Index Compa	arison Other
Star Rating (within Angus breed)	Economic Indexes	Purpose	€uro value	Index reliability	Star Rating (across all beef breeds)
****	Replacement (per daughter lactation)	To breed future cows for the suckler herd	€142	46% (Average)	****
****	Terminal	To breed beef animals from the suckler herd that are destined for slaughter	€86	50% (Average)	*****
****	Dairy Beef	To breed beef animals from the dairy herd that are destined for slaughter	€96	53% (Average)	****