THE FERTILISER ASSOCIATION OF IRELAND

DEVELOPMENT OF FERTILIZER USE IN WESTERN EUROPE

P. F. J. van Burg

IRISH FOOD PRODUCTION IN THE YEAR 2000

Matthew Dempsey

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DR. PIETER VAN BURG — OBITUARY

Pieter van Burg was born in the Netherlands and graduated from the Agricultural University of Wageningen. He worked in Africa for seven years before returning to the Netherlands to work for the Netherlands Fertilizer Institute (NMI).

He performed some outstanding research work on the fertilization of grassland at the Soil Fertility Institute at Haren. From 1976 until his retirement in 1988 he was Director of the NMI. He became an international figure in the soil fertility arena, reading papers all over the world. He was Chairman of the editorial board of the journal 'Fertilizer Research' and a member of numerous boards and committees.

Pieter van Burg was a big and generous man. He worked tirelessly and gave freely of his time and expertise. He visited Ireland many times. Sadly, his visit to read a paper at the 1989 Winter Meeting of the Fertiliser Association of Ireland was to be his last time to come here. He died on June 21st 1990.

Ar dheis Dé go raibh a anam dhílis.

DEVELOPMENT OF FERTILISER USE IN WESTERN EUROPE

By P. F. J. van Burg

When talking in this paper about fertilizer consumption in Western Europe the discussion will be restricted to the intensive agricultural countries-Germany, France, UK, Denmark, Ireland and the Benelux where environmental issues are almost daily news. These countries consume some 11.8 million tonnes of N + P + K mineral fertilizers, over 60% of which is nitrogen (table 1).

Table 1. N. P and K consumption (million t) in Western Europe: D, F, GB, DK, EIR, B, L and NL.

Nutrient	Million Tonnes
N	7.2
P	1.3
K	3.3

Surplus production within the EC is exerting considerable pressure on national governments and on Brussels to change their agricultural policies and to limit crop production. Secure food supplies have heightened public interest in farming, farming methods and the use of agrochemicals including fertilizers. On the other hand the concern about the impact of agriculture on the environment is growing and in particular politicians seem to be concerned. The debate is often ill-informed, prejudiced and emotional on both sides. Politicians like to side on the green wave and it is therefore not surprising to come across the following editorial in the Farmers Weekly of 29th September, 1989: "Government plus greens make a dangerous mixture". The environment is not only fashionable on our side of the Atlantic. During my visit to the USA in October I was really quite amazed by statements in a report on 'Alternative Agriculture', recently published by the US National Research Council and I quote:-

'Alternative farms use less chemical fertilizers, pesticides and antibiotics without necessarily decreasing - and in some cases, increasing crop yields and the productivity of livestock systems.

'Agriculture is the greatest single non-point source of surface water pollution'.

'Wider adoption of alternative systems would result in even greater economic benefits to farmers and environmental gains for the nation'.

Another American example is the movement which has become identified as LISA, an acronym which stands for Low Input Sustainable Agriculture. It includes terms such as regenerative agriculture and organic farming. In December 1987 the US Congress appropriated almost 4 million US dollars to begin work on crop production programs with emphasis on low input and sustainability. The language of the appropriation stated.... 'A growing number of farmers are looking for reliable information on reduced input systems to reduce cost, control erosion and monoculture cropping systems'.

These quotes illustrate the present day atmosphere around agriculture.

Modern agriculture, of course, has the potential to affect the environment considerably, but it is not justified to regard farmers as irresponsible polluters of our environment. Farmers should not be penalised for what society has asked them to do in the past decades. Farming has to be changed but farmers must have sufficient time to adapt themselves.

Let us discuss now the various aspects of the two constraints on the development of fertiliser use in Western Europe:

Environmental: Nitrogen (nitrate, ammonia, nitrous oxide and methane), Phosphorus and Potassium.

Surplus production: Extensification, Quota, Set-aside and Prices.

ENVIRONMENTAL CONSTRAINTS

Nitrogen

Nitrogen is a vital component of our environment, air, water, soil, plants, animals, food, -no part of the environment is free of nitrogen. Nitrogen is a highly versatile and elusive element, whether in the air we breathe, the water we drink or the protein we eat.

I will now discuss the environmental problems in which Nitrogen is involved.

Nitrate (NO_3)

Nitrate (NO_3) is highly soluble and mobile, and is readily leached from the soil. Leaching is a natural process that will take place when rainfall exceeds evaporation. The amount lost depends on the nitrate concentration in the soil.

Nitrate levels in ground and surface-water are rising in many areas and countries in W. Europe. According to a statement of the EC Commission...'the increased and sometimes excessive use of fertilizers and over-concentration in the intensive livestock sector have been identified as contributory factors'. The fivefold increase in the use of N-fertilizer since the fifties has naturally made the fertilizer source suspect. Since 1980 the EC drinking water directive sets a maximum of 50 mg NO_3 per litre with a guide value of 25 mg. These standards came into force in 1985. However, no scientific arguments were stated for halving the WHO-standard of 100 mg NO_3 per litre. The water nitrate standard is set to protect public health. Documents of the EC Commission frequently state 'Nitrogen is undesirable because of its health risk to man'. The major health hazards indicated are: methaemoglobinaemia (MhB) and gastric cancer.

Methaemoglobinaemia (MhB) or blue baby disease is caused by nitrate converting the haemoglobin in baby blood to MhB restricting its oxygen carrying ability. MhB is very rare in W. Europe where almost 98% of the population is connected to high-quality public water supplies and poses no real problem.

Gastric cancer: there is concern that nitrate intake can cause gastric cancer but recent medical evidence based on results of epidemiological studies and of specific research does not support a link between nitrate and cancer (ECETOC Report 1988).

Without question health goals should have high priority and standards should necessarily err on the side of safety but the medical evidence suggests the EC Nitrate standard to be excessively stringent and unwarranted because there is no evidence that lowering one's nitrate intake will have any positive effect on one's health.

National Governments and politicians have accepted a limit which is nothing but a collection of hypotheses that crept willy-nilly into EC law over a period of 5 years, and nothing was done till it was too late. Can the EC standard of 50 mg ever be changed? EC decision making is a difficult process and I do not think that the standard will ever be eased to the 'original' WHO standard of 100 mg per litre. The best one can hope for is to prevent the present standard being reduced to the guideline level of 25 mg NO_3 per litre.

It is not my intention to imply that nitrate in groundwater is not a problem and that nothing should be done about it. On the contrary, the media are filled with reports of growing nitrate levels in water and the hazards associated with it. The long-term best interests of agriculture in total and the fertilizer industry in particular will be served by doing everything that is needed to promote maximum nitrogen efficiency thereby lowering nitrate leakage to the environment. The main objective of fertilizer application is uptake by the plants. Nutrients absorbed and utilised by a crop to provide yield do not pollute the environment.

Nutrient losses from soils are a non-productive financial overhead for the farmer: He is loosing money. An excessive or poorly managed supply of nitrogen intended for crop production causes or enhances such losses. Farmers should voluntarily adopt good agricultural policies instead of risking compulsory regulation. However, the emphasis upon mineral nitrogen fertilizers as the major source of nitrate leaching overlooks the prime sources being soil organic matter, crop residues and the indiscriminate use of animal manures.

There will always be substantial background nitrate leaching, even if no mineral fertilizer nitrogen is applied, as for instance in the case of extensification or of land taken out of production (set-aside).

For arable crops, the consensus concerning nitrogen (nitrate) losses from mineral nitrogen fertilizers is illustrated in Figure 1, where yield and leached nitrate are plotted against applied mineral nitrogen. Figure 1 shows clearly that the amount of leached nitrate increases only slightly with increases in the amount of mineral nitrogen, applied within the range of nitrogen rates where yields are increased with increased application rate. However, when the point of 'maximum' yield is exceeded, nitrate leaching increases exponentially. Figure 1 is somewhat over-simplified because soil type and crop have an effect on the leaching curve. There are indications that for potatoes and oil seed rape lower than optimum nitrogen rates may be environmentally desirable, while cereals behave as in Figure 1.

Farming methods and systems which minimise nutrient losses to the environment should be developed and promoted. Efficient and well equipped agricultural advisory services have a major role to play in promoting these sound farming practices. The conclusion is to apply nitrogen fertilizer at the optimum time and at the correct rate, particularly avoiding excess amounts, sometimes applied as an insurance. Then there is not much reason for concern and the farmer kills two birds with one stone, because (i) nutrient losses are a financial loss to the farmer and (ii) it gives rise to less environmental problems.

Grassland farming poses a special problem. The production system of permanent pastures with a continuous soil cover is a most efficient N-user and on cut grassland N-leaching losses are low. However, as soon as grazing animals are involved pastures become very inefficient N-P and K-cycling systems. The perturbation is imposed by the

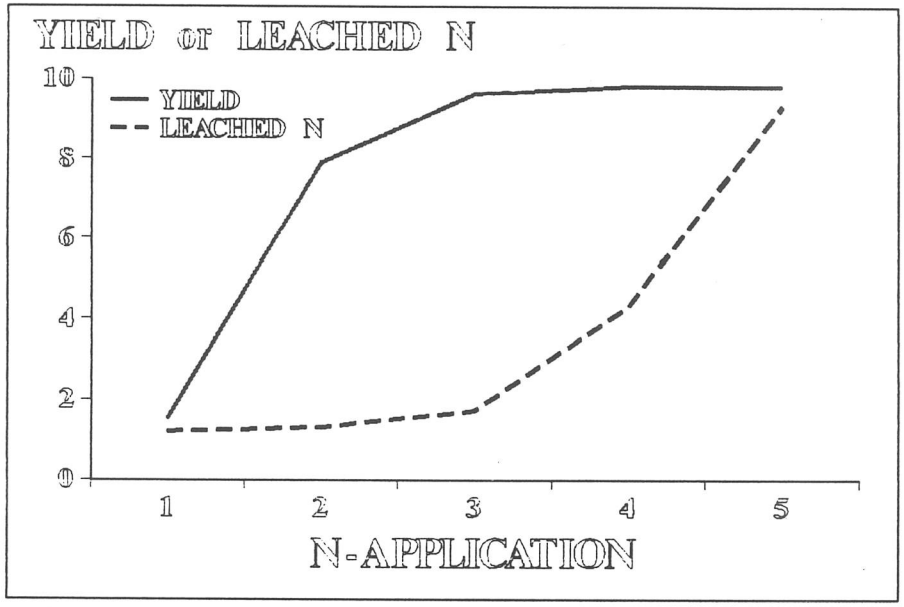

Fig. 1: Schematic representation of yield and leached nitrate as affected by rate of mineral Nitrogen fertilizer

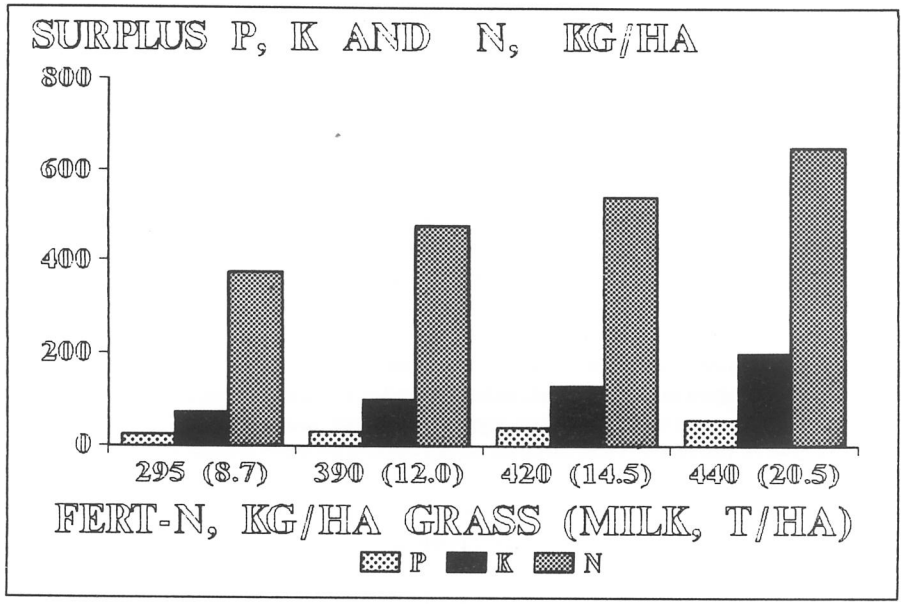

Fig. 2: Surplus of P, K and N relative to intensity of farming, as expressed by rate of mineral fertilizer Nitrogen and milk production (between brackets). From left to right stocking rate increased from 1.6 to 1.9 to 2.2 and 3.0 dairy cows per ha. Source: Survey of 342 dairy farmers in the Netherlands.

ruminant animal which excretes a very large percentage of the N,P, and K contained in the ingested feed (herbage and concentrates). To illustrate the magnitude of the environmental problem, N-P and K-balances are given from a recent survey of 342 dairy farms in the Netherlands (Figure 2). In figure 2, P-,K- and N-surpluses (nutrient input minus nutrient output) are plotted relative to intensity of farming (nitrogen rate and milk production per ha). It is evident that nutrient surpluses are excessive even for the rather low intensity group and the figures indicate a large potential for loss of nutrients to the environment.

Averaged over the 342 dairy farms P-,K- and N-input amounted to 55, 150 and 600 kg per ha, respectively, while P-,K- and N-output was 18, 30 and 96 kg per ha, respectively. This means rather low nutrient efficiencies of 34, 20 and 16% for P,K and N respectively. It is clear that every effort should be made to lower the potential for loss by maximising nutrient efficiencies, whether from mineral fertilizers, manure or feed input. It may be even necessary to decrease the input.

Ammonia (NH_3)

The second nitrogen related problem is the emission of ammonia from the animal husbandry sector. For the Netherlands ammonia is high on the environmental priority list. This is understandable when comparing the 221,000 tonnes NH_3-N emission (animal husbandry is responsible for 90% = 201,000 tonnes NH_3-N) with the 450,000 tonnes mineral fertilizers nitrogen consumed. Ammonia is part of the acid rain problems; it causes forest degradation by upsetting the mineral balance in the soil (extremely high N relative to P, K, Mg, Ca) and eutrophication. The Dutch National Environmental programme is set to reduce ammonia emission by 70% in the year 2000 as compared with 1980. Of the 201,000 tonnes NH_3-N emission from animal husbandry, about 35, 53 and 12% is derived from housing/storage, application and grazing, respectively. Reducing ammonia emission under grazing is not easy to realise. Additional feeding at pasture of low protein products (silage maize) is a possibility, but the total amount of ammonia emitted from grazing is relatively low, only 12%. Better application techniques (injection, sod fertilization) and acid additives offer opportunities to reduce ammonia emission considerably, while at the same time increasing the efficiency of manures, thus affecting mineral fertilization nitrogen consumption negatively. I will come back to this later.

Greenhouse gases: Nitrous oxide (N_20) and Methane (CH_4). These two gases contribute 5% and 10%, respectively to global warming.

Nitrous oxide, one of the chemicals that reduce the ozone layer is a product of denitrification in the soil. It is assumed that fertilized soils contribute 15% of the global N_20-flux and that 0.01-2.00% of the fertilizer nitrogen applied is released as N_2O.

The methane problem is not usually associated with nitrogen. Methane is produced by the degradation of organic matter under oxygen-deficient conditions (wetland rice) and by ruminants. Recently an article in the journal "Nature" stated that the steady increase in tropospheric methane by 1.3% per year may be due to either increases in global methane sources and/or decreases in global methane sinks. The largest biological sink for methane is micro-organisms in aerobic soils. A study by Steudler and others has shown that increases in nitrogen fertilization cause lower methane uptake rates by soil micro-organisms, which may result in an increase of methane in the atmosphere.

Nitrous oxide and methane are not yet very hot issues in Western Europe, but will sooner or later become hot issues. Agriculture and the fertilizer industry should be

prepared for them and should not wait till these chemicals become an acute problem. Then it is too late!

Phosphorus

Phosphorus is mainly a problem of eutrophication: the enrichment of ground water and surface water. Phosphorus is retained strongly by most soils (i.e. fixation) and, therefore, leaching losses are low, (0.05-0.25 kg per ha/per year). Phosphorus losses are caused mainly by run-off. Ironically, the extremely useful ability of the soil to fix phosphorous is partly responsible for the over-application of phosphorous to the soil.

In those areas where large overdoses of phosphorus in the form of animal manures are applied, the bonding capacity of the soil for phosphorus, may get saturated and consequently phosphorus will leach, and ground water and surface water will be enriched. The situation in the Netherlands is rather serious because of the "undesirable" phosphorus balance of Dutch agriculture. Between 250,000 and 300,000 ha agricultural land have to be classified saturated or almost saturated and thus sensitive to leaching. Figure 3 illustrates the unbalanced phosphorus status of Dutch agriculture. Other West European countries like the FR Germany show the same trend, however, not as extreme. In the Dutch Soil Protection Act limits are set for P-application as animal manure. The present limits for arable land, grassland and maize land are 55, 110 and 155 kg P per ha per year, respectively. The ultimate limit will be P-input (organic + inorganic) equals P-output.

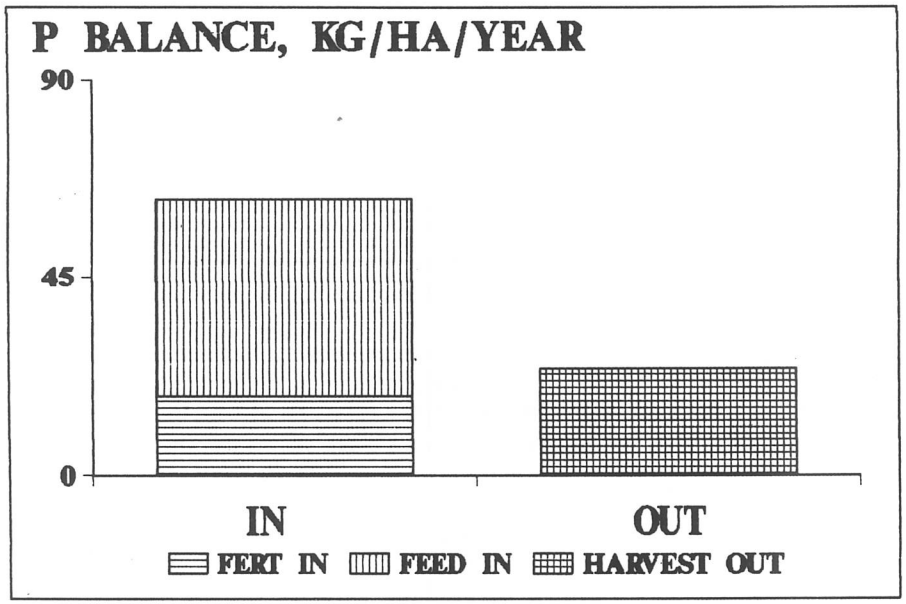

Fig. 3: The Phosphorous balance of agriculture in the Netherlands in kg per ha per year.

Potassium

There are no environmental problems with potassium as yet except that in some areas the K-concentration in the groundwater is above the standard for drinking water. Chloride concentrations may be too high as well. Where there are problems they are caused by excessive applications of animal manures.

Animal Manures

Animal manures constitute the most serious constraint for the consumption of mineral fertilizer. In Western Europe (See Table 2), some 750 million tonnes of manure are produced, 545, 188 and 14 million by cattle, pigs and poultry, respectively. These amounts of manure contain a considerable quanity of nutrients (Table 2).

Table 2: **N, P and K (million tonnes) contained in animal manures in Western Europe: D, F, GB, DK, EIR, B, L and NL.**

Nutrient	Million Tonnes
N	3.4
P	0.9
K	3.5

Improvements in the utilisation of manure, for instance doubling its efficiency, would result in quite an amount of mineral fertilizer nutrients being replaced by manure nutrients. This would mean loss of mineral fertilizer consumption. Animal manures have to be used more efficiently.

Methods to improve the utilisation efficiency are:

- Injection, slurrygation, better timing, etc. Injection, sod fertilisation, slurrygation (either irrigating a manure/water mixture or irrigating directly after manure application), reduces the volatilisation of ammonia, thereby increasing the N-efficiency. Injection of animal slurry on grassland doubles for instance its N-efficiency and less mineral fertilizer nitrogen is required.

- Processing animal manures into solid, granulated or pelleted organic fertilizers which can be easily transported, handled and applied on arable and horticultural crops, partly as a replacement of mineral fertilizers. Guarantees have to be given that these products are free from viable seeds and pathogens. However the present scale of operation is still very small and economically these processed manures are unattractive: their nutrient cost price is about three times higher than for mineral fertilizers, while their transport and storage will be considerably higher as well (low grade products).

- The use of additives. Most interesting is the nitric acid based additive, (called ORGAKEM), for slurry, developed by the fertilizer manufacturer Kemira in the Netherlands in order to reduce ammonia emission during storage/housing and application. The results of many laboratory, field and on-farm studies have shown that the use of this additive is very promising: during storage/housing ammonia emission can be reduced by 50%, while ammonia emission from surface applied manure can be reduced to almost nil (Figure 4).

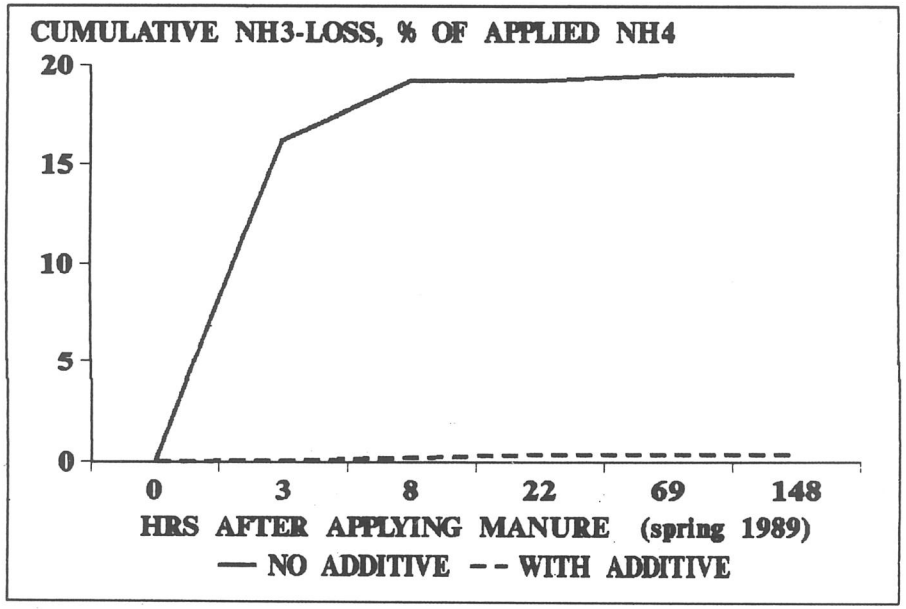

Fig. 4: Effect of the nitric acid based ORGAKEM additive on the cumulative ammonia loss from surface applied animal slurry.

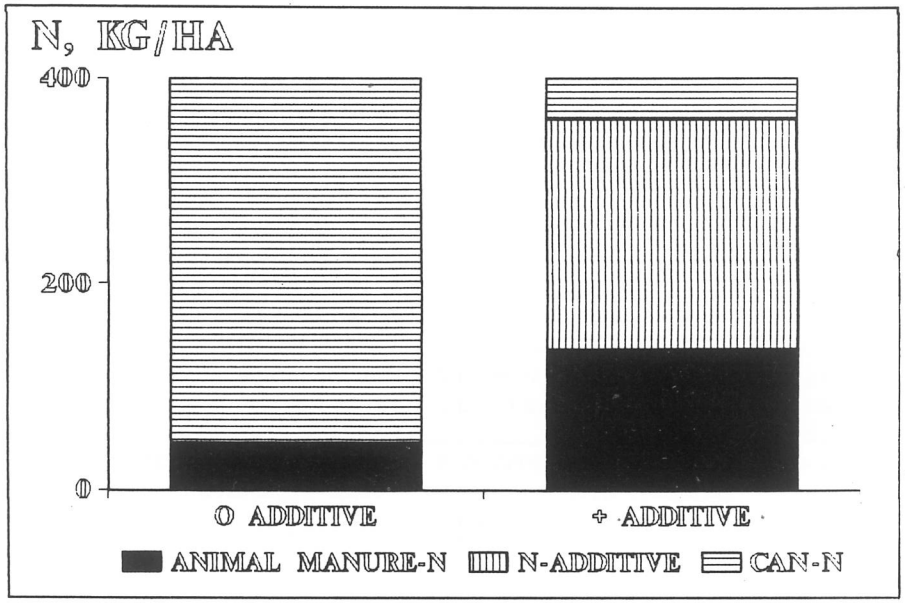

Fig. 5: Effect of nitric acid based ORGAKEM additive on animal slurry efficiency.

The consequences of using a nitric acid based additive are:

- Animal manure and additive can be utilised very efficiently on a dairy farm because the additive makes the animal manure a balanced NPK fertilizer for grassland.

- National ammonia emission from the cattle husbandry sector can be reduced by almost 70%.

- Dairy farmers may reduce their mineral fertilizer nitrogen purchases considerably, as is illustrated in Figure 5 for a dairy farm with a stocking rate of three dairy cow units per ha, day grazing and night housing and a nitrogen rate recommended by the Advisory Service of 400 kg N per ha The left hand column without additive shows that 355 kg N per ha has to be purchased as mineral fertilizer, (CAN = Calcium Ammonium Nitrate), while with additive only 40 kg N is required as mineral fertilizer. For the latter case 225 kg N as nitric acid additive had to be purchased. This means a total of 40 + 225 = 265 kg mineral nitrogen, as compared with 355 kg mineral nitrogen without additive, a saving of 90 kg mineral nitrogen per ha. If the additive method were to be used on a nation wide scale, the CAN consumption in the Netherlands could be decreased by 80,000 to 100,000 tonnes N (equivalent to approximately 20% of the present N consumption).

Surplus Production Constraints

In addition to environmental constraints, there are constraints imposed by surplus production and agricultural policy.

Extensification

The EC wants farming to go for low input low output in its battle against food surpluses and politicians and the environmental movement state that extensification and organic farming in particular, have the additional advantage of protecting the environment. However, extensification will have generally only a modest effect on the environment as can be deduced from the cases in Figure 1. Applying less, even considerably less nitrogen than the optimum rate will scarcely reduce nitrate leaching to the groundwater.

A clear disadvantage of extensification is the increase in production cost of agricultural products (Figure 6), and consequently in food prices. There is strong evidence that an agricultural system involving low variable inputs per unit of land, cannot sustain itself in a well developed agricultural economy. Extensification by reducing the input of mineral fertilizers will not sustain the competitiveness and profitability of European farming. Extensification is therefore not in the interest of the EC agricultural industry and or the national economies. Management systems aimed at high yields usually provide the best possibility to reduce environmental problems associated with crop production.

Quota

Any quota system is a serious constraint on fertilizer use because yields will continue to rise. We cannot uninvent modern techniques and production methods. Consequently less hectares or less cows are needed to produce a constant quota of products as is shown in Table 3. From this table it is evident that a quota system has a negative effect

on the amount of nitrogen required on an intensive dairy farm. Assuming a rise in milk production of 1,000 kg per cow which can be attained easily in five to six years, the farmer needs eight cows less to produce his quota. To be self-sufficient in forage, he may reduce his nitrogen application by 100 kg per ha.

Table 3: **Effect of an increase in milk yield per cow on the number of cows needed to produce a milk quota of 316,000 kg and on the amount of nitrogen needed to be self-sufficient in forage. Farm size: 25 ha grassland.**

Milk, kg/cow	6,000	7,000
Number of Cows Needed	53	45
Nitrogen Required For Self-Sufficiency In Forage, kg N/ha	400	300

Assuming that milk quota will remain with us for years to come and that the average milk production per cow in the EC will increase by some 100 kg per cow per year, the number of cows required to produce the present EC quota needs to be reduced by about 20% in the coming five to ten years. Consequently fertilizer nitrogen usage can be reduced drastically.

Arable crop productivity tends to rise too. As there is little expectation in the EC of an increase in market demand due to population growth, and as opportunities for export into the world market are limited, the surplus situation will only become greater if no restrictive measures are taken. The EC policy to curb grain production by introducing

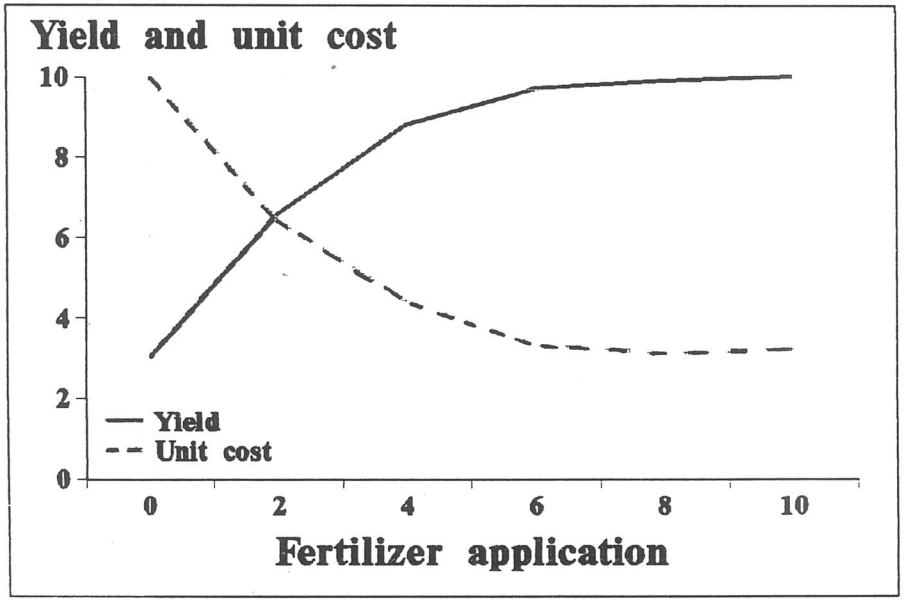

Fig. 6: Schematic effect of rate of fertilizer application on yield and unit cost price.

a set-aside premium and the so-called stabilisers has failed. A more restrictive EC policy which will impose country quotas seems unavoidable. As a result the cereal area will be reduced appreciably and be converted to "alternative" crops (neither potatoes nor sugar beet belong to this category) and/or fallow. Less nutrients will then be required and fertilizer use will be affected negatively. This brings me to set-aside.

Set-Aside

It is quite clear that taking land out of production must have a considerable negative effect on mineral fertilizer consumption.

According to popular belief set-aside is said to be good for our environment. There is actually very little truth in that because for instance, nitrate leaching from bare fallow set-aside land is almost as high as from a field or wheat with an optimum amount of nitrogen. The reason is that the so-called background nitrate leaching, derived from the mineralisation of organic matter, continues in land taken out of production. It is a different matter when farmers are paid for an "environmental" set-aside based on sowing grasses for a green cover only.

Rather than setting land aside to be unproductive, the opportunities and possibilities for non-food production (bio-energy, cellulose, sugars, starch) should be explored far more actively. Most bio-products are not yet competitive. May I suggest to use the set-aside premium in a more productive way, i.e. to subsidise and stimulate the production of such bio-products, which have environmental advantages (e.g. bio-energy is CO_2 neutral).

The fertilizer industries have to be in the forefront to develop agriculture's potential as raw material producer.

Prices

EC farmers have to live with lower prices for their products. The CAP should be more market orientated, not only in price but also in volume and quality. The overall effect of lower prices on fertilizer consumption is still rather small. The efficiency of production must have the highest priority: nutrient losses should be minimised as they constitute a serious financial loss to the farmer. As a result good fertilization practice goes hand in glove with environmental protection.

Future Fertilizer Consumption in Western Europe

Projecting the future demand for mineral fertilizers in the intensive agricultural countries (see heading of Table 1) of Western Europe is difficult because there are many uncertainties.

EC's agricultural (surplus production) and environmental (nitrate in water issue) policies as well as national anti-pollution policies and Soil Protection Acts (ammonia emission, animal manure application) will when finally implemented, restrict fertilizer consumption severely.

Agricultural policy on surplus food production has the potential to cause 15 million ha food crop area to be released, for which there are presently very few alternative crops. Enforcing for instance the EC Nitrate in drinking water standard as the criterion for upper groundwater, would affect some 15 to 20 million ha of agricultural land with an estimated potential total nitrogen loss of 1.0 to 1.5 million tonnes. The utilisation efficiency of animal manures can be improved quite easily by better storage and handling (application

methods, application timing, additives, processing). Such an improvement would generate enough nutrients to replace approximately 2.0 million tonnes N + P + K as mineral fertilizers.

However, while animal manures can be as effective as mineral fertilizers, they can have a negative impact on the environment, they are more of a pollution risk.

On the basis of our present knowledge, the actual and expected environmental and policy regulations, and the experience in The Netherlands, an attempt has been made to project the demand for mineral fertilizers in eight agriculturally intensive EC countries in Western Europe. A positive effect on fertilizer use from diverting set-aside land to the productive of bulk raw materials has not been taken into account. I am rather pessimistic about the mineral fertilizer prospects and foresee a decline in fertilizer consumption between 10 and 25% during the period 1989 to 2000.

IRISH FOOD PRODUCTION IN THE YEAR 2000

By Matthew Dempsey.

Let me first thank you for the opportunity to set any thoughts I might have on this subject before you.

We can basically set the food industry into two distinct groupings - those catering for the home market - the domestic Irish consumer is the firm's only, or at least the main, customer. In toto, there are 300 of these firms. They use the full range of ingredients found in every modern food consuming democracy.

But, for Ireland, food and agriculture is much more than that. There are only two countries in Europe with a positive food and agriculture balance of payments in their dealings outside Europe - Ireland and Denmark; £500 m for Ireland, £1,000 m for Denmark.

But to boil that down a little further. Clearly, the overall figures have some distortions - the Dutch have massive exports of food and agriculture from Holland, over 16 billion ECU, almost 5 times the total Irish level from an area the size of Munster. But these are counterbalanced by their cereal substitute imports through the port of Rotterdam of 6 billion.

No matter what way we do the sums, beef accounts for 36.7% of our agricultural output and dairying accounts for 34.6% - a dependence of over 71% on the bovine alone. Despite our small size, these account for 4% of EC milk production and 6.5% of EC beef production.

However, our dependence on these is hamstrung by two key considerations:

In the case of dairy products, production is constrained by an extraordinarily rigid quota - without even the flexibility of a C quota sugar - type arrangement allowing production of above quota output at world market prices. On top of this exceptionally rigid production control is the awkward fact for Ireland that this internationally is by far our most competitive sector. The recent first-class study undertaken by Teagasc on behalf of the Department of Agriculture and Food demonstrates reasonably clearly that in a free trade environment developed Irish dairy farmers would be significant purchasers of dairy quota - that is, buying the right to produce a necessary commodity at a reasonable price. It is worth reminding ourselves that the Dutch have roughly 7-8 times our milk output per acre, yet, because of the paralysis that affects genuine Irish initiatives at EC level, I believe that the essential features of the present quota regime will be present in the year 2000.

Given also that, like Smurfit, Goodman, the Banks, our major Irish dairy co-ops are branching outside the country, it is reasonable to assume that the make-up of Irish dairy output within Europe will swing more closely into line with more developed European counterparts.

So what are the Irish bench-marks along the way to where we can be compared with Denmark and the Netherlands? The consequence of this type of progression will have

a major impact on our total dairy returns, but the most significant impact will be felt not, I think, from this major production shift, but will primarily be from major facilitity closures within the Irish dairy industry.

These will be of minimal importance as regards food manufacturing; the essential bench-marks of reasonable demand, high quality products and a strong industry at both co-op and private level are already in place.

On the dairy side, at present levels of production and consumption, we have an enormous exporting obligation in dairy products - our self-sufficiency ratio is over 65%. But before we get carried away with our disadvantages and the low size of our domestic market, we should be looking at who we are meant to be comparing ourselves with.

We complain that we have a small domestic liquid milk market in comparison with our neighbours, and this accounts for our seasonality and why we have to make butter. Wrong, completely wrong. We should look at the figures. Granted the U.K. sees 22% of their output drunk by their liquid consumers - we consume about 9%, or less than half. But how about our competitors on the international scene? In both Holland and Denmark their liquid sales were both only 6% of total production - less than ours.

In 1987, the latest date for which there are full comparable statistics, the utilization of milk in Denmark and Holland are identical - 39%/40% into butter; ours in the same year was 64%; 31%/32% of their output went into cheese; 14% of ours. The industry in the Netherlands and Denmark is grouping itself into firms processing 450-500 million gallons - approx. 100 million is our max. size. Clearly, given the problems with butter consumption, the reductions in intervention support and the likelihood of continuing processing over-capacity, especially if, as it must, the seasonality pattern becomes more even, so on the dairy side as we inevitably develop into a food industry, what are the essential bench-marks along the way on this rocky road to the year 2000?

1. The seasonality pattern approaches the European norm of 2:1 versus our present level of 9:1.
2. The utilization pattern of our milk continues to make progress towards the norm of our exporting partners - or should we say competitors - of the % going to butter drops from over 60% to less than 40%, and cheese doubles from the present less than 15% to over 30%.
3. The industry gets together. The first bench-mark here is the emergence of the 200 million gallon processor - not scale for scale's sake, but for efficiency, muscle in selling and devotion to R & D. This means closures.
4. The final bench-mark is when a dairy co-op takes over a private dairy company. For the last three examples the trend has been the co-ops succumbing to the temptation to sell today and hope for the best tomorrow, but co-operatives should not be incompatible with efficiency and profitablity. They were built up on the basis of members sinking their equity into a business and not looking for dividends or capital appreciation. In the sphere of co-op privatization, we are ahead of developments in Ireland compared with the rest of the world.

So, on the dairy side, the aims are clear and the measurable bench-marks are there.

The Beef side is very different.

The industry is utterly dominated by one firm - in a far more pervasive way than the 40% of total capacity would suggest. The effective demise of the specialist boning halls,

the alarming gyrations in seasonality of supply, the removal of the A.P.S. overhang from the market, all point to the overwhelming strength of this one company. What was just a few years ago the white-haired boy industry of Irish agribusiness has now developed to where the I.D.A. is appalled at the wasted millions, where seasonality is more pronounced than in the mid-seventies, where boneless beef sales - the great hope of our future - is at best erratic and its growth disappointingly slow, where Ireland Ltd. is still the prime example of the commodity producer, with an eye towards the Iraqi dinar in October rather than a French franc in April. This is the state of play after more than 10 years since the transitional period of EC membership finished in 1978.

In another ten years do we seriously expect things to be different? Our beef steers are dominated by a mediocre Friesian producing an 04 carcase of about 800 lbs - one of the most unsuitable carcases to be found anywhere in the civilized world.

With the ban on implants not affecting anybody except Ireland, we are not aiming for the high priced European market with our middle weight, overfat, badly conformed carcases. That is a critical bench-mark and the continuation of export refunds is another, because nobody wants that kind of 04 beef except those with oil money and who in their own civilization are the first generation eating beef. The amount of steer boneless beef going to continental Europe is decreasing as our beef gets worse.

I spent the month of June in America. In California, the most environmentally conscious society on earth, where eternal youth and sunshine are prerequisites, they have all kinds of opinions - one society campaigns against cow auctions as offending bovine dignity. The equivalent of our Department of Agriculture and Teagasc rolled into one have 40 qualified staff operating in the field as technical advisors; they have ten times as many - 400 graduates, mostly Ph.D's - checking the safety of food. Fungicides on wheat, sprayer safety of farm workers, Alar on apples, are issues, but implants in cattle are not an issue.

The checking of the carcases for residues is thorough to the point of paranoia, but at farm level they are not an issue because of the overwhelming evidence in their favour - both scientifically and as regards safety. We have gone down a Green blind alley in this area - we are hurting nobody but ourselves, benefitting nobody except our opposition and ending up with worse cattle, at higher cost, suitable only as hamburgers or for those whose taste is developing on the road to sophistication.

Our boneless beef trade to Germany, France and Italy was all lower in 1988 than in 1987, and this was during a period when the EC was moving towards bare self-sufficiency in beef. Our seasonality swing was approximately 2½:1 in 1975; this year it is close to 13:1. We have gone backwards.

Our total beef exports to continental EC countries is less now than it was in any year in the early 1980's. The last four years have seen a continuous decline and we have become progressively more dependent on the British market. But one of the factors overlooked in this humble self-congratulatory mood for the U.K. market is that for the last sixteen years we have had a significant advantage over any other exporter to the U.K. because of our preferential access to the U.K. variable premium.

The bench-marks are clear; the most critical issue is seasonality. When our peak/valley ratio gets to 2 or 1.5:1, when Third World commodity markets - and this is the key point - which need continuous subsidies from Brussels, are taking 10% rather than almost 50%, as they did last year, then I'll go along with the description of our beef industry as a food business. These Third countries took 25% in 1981. Is 10% such an impossible target for 2000? Boneless beef took 20% last year of carcase equivalents to all EC destinations,

with a value of £175 m. We are a long way from a food industry in our beef business.

Our sheep industry, on the other hand, has taken an entirely different route. Practically all our product goes to a high quality, reasonably priced French market. Our carcases are probably too light at the appropriate fat cover. But we are clearly in the food business. Despite a very high self-sufficiency ratio compared to even a few years ago when it was only 130%, there has been a steady expansion based on market returns and future prospects.

For the year 2000, where will it be?

Sheep numbers are now at their highest level ever both in Ireland and, so far as I can find out, in the Community. Prices are under pressure and while the basic Community framework is in place for the next three years, I would be surprised if numbers did not increase by at least 50% in Ireland by the year 2000. The trend towards boneless vac-pack product will in general, I feel, be very slow.

Probably the most exciting developments are now taking place on the pigmeat side.

The fall-out from the last few years has been astonishing in any terms. From 27 separate plants, we now have only 5 main players - three of them co-operatives - Avonmore, Kerry and Mitchelstown, with Avonmore alone having 40% of national kill.

This time last year, one of the major bench-marks in the pig industry would have been a rationalization of our processing facilities. This has now occurred.

But there are a few more obstacles to be crossed:

Our pigs are wrong. Our genetic base is weak, with a lack of suitable objective breeding information available. Our average slaughter weight at 64 kg compares with an average of over 80 kg in the rest of the community. The conversion efficiency of our pig is poor despite our exceptional fertility figures. Recent developments in the import facilities at Cork and Foynes are going to mean less feed differences between Dutch and Irish feed prices; while the Dutch are coming up against one major problem - their own environment. This is putting a permanent cost disadvantage of £3-£5 a pig.

The bench-marks to achieving the I.D.A. targets - and essential bench-marks are being achieved - are:

- Profitability
- Processor rationality
- Good pig production units
- Competitive feed costs
- We still need conversion efficiency and quantification of environmental advantage.

We produce 2 million pigs a year; the Dutch 19 million, in the space of Munster. Today, a doubling is a modest target by the year 2000 - last year it seemed an eccentric dream.

For practically all other food-based products manufactured from Irish raw material it will be a question of trying to maintain our home market. Clearly there will be niche specialities - venison, smoked salmon, mustard.

Mushrooms are the key exception, but we should be clear why the mushroom industry and its £26 million of exports is there:

1. Good, intensive research and technology.
2. High advisory input.

That particular combination is no longer available to the same extent.

But mushrooms are food at their basic. They are essentially hand-picked commodities.

The major problem is now clearly on our tillage side; sugar production has and probably will continue to be safeguarded by the EC quota regime. Without it, we would simply not have a sugar industry.

As our flour imports grow from less than 15% at the beginning of the decade to over 30% today, there is constant painful rationalization taking place; our cost structure at industry level is down, thanks to the 39p Ben Dunne loaf, to U.K. levels or below, but we are into the price of EC grain and all that that implies.

One, and only one, bench-mark is of critical importance here:

How the U.S. continues to subsidise its grain growing. We in Europe have not understood or reacted to developments in U.S. cereal support systems. All U.S. maize or corn wheat is subsidised. Both products are sold at below their costs of production, both within the U.S. and abroad. Maize gluten is doubly subsidised from the Ethanol programme and by the Deficiency programme; yet we accept it into the Community totally levy and duty free. This is not competition from efficient producers; it is competition from grossly and routinely subsidised producers. Where there is a similar deficiency payment in the case of lamb exported out of the U.K. to the Continent, there was and still is a clawback. There is no such clawback on the exports of corn gluten as they come to Europe and I am not aware that we have ever asked for it. No wonder it was America that asked for Agriculture to be excluded from previous G.A.T.T. rounds.

In conclusion, the overwhelming bench-mark is where a sensible regime is put in place, as in sheep, and to an extent dairying in a European framework. Farmers can plan and so can industry. We are seeing the fruits in each case. Where the regime is wrong and is coupled with the possibility of endless political and bureaucratic interference, the result is catastrophic for most and highly beneficial for a few.

We need a sub-group within the NESC for agriculture; we need a consensus of desirable action. We will never get a consensus of wishes because interests are different within the sectors. In a democracy a government is elected to govern in the national interests.

My bench-mark as we head towards 2000 is: How level is the playing field - in commodity regime and in taxation? The more level it is, the more optimistic I would be.