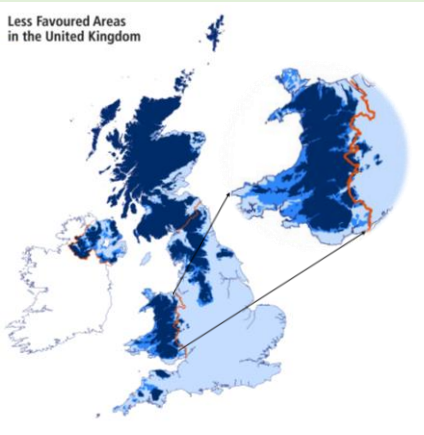
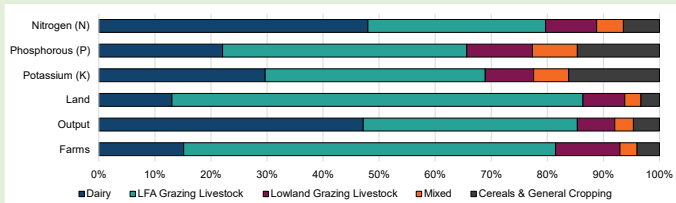


## Distribution of farm types



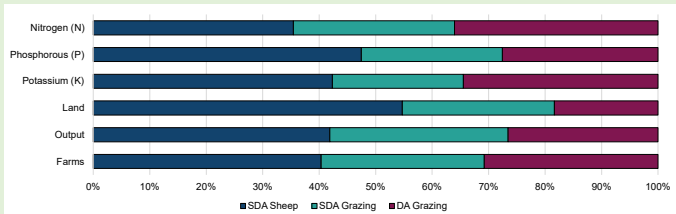
**Figure 1. Distribution of less favoured areas in the United Kingdom**

Mountainous terrain, steep slopes and high rainfall mean 79% of land is designated as Less Favoured Area (LFA), where challenging conditions make farming more difficult. Cattle and sheep farming on LFA land is the most common farm type in Wales (25% of all farms). SDA are the most challenging areas and are largely upland in character. In Wales there are sufficient farms to show SDA sheep specialist, SDA mixed cattle and sheep and DA cattle and sheep farms separately.



**Figure 2. Share of farm types: NPK, land, output and number of farms, 2022-23**

Dairy farms make up the largest proportion of nitrogen application and output in Wales whilst LFA grazing livestock farms make up the largest proportion of farms, phosphate application and land in Wales. Lowland grazing livestock, mixed and cereals and general cropping farms make up the smallest proportions across each of the six categories.



**Figure 3. Share of LFA farm types: NPK, land, output and number of farms, 2022-23**

SDA Sheep farms make up the largest proportion of output (41%), land (55%) and farms (40%) of all LFA farms in addition to the highest proportion of NPK application across the LFA farm types (11%, 21% and 17% respectively).

SDA Grazing livestock accounts for just under a third of all LFA output (31%), 27% of land and 29% of farms and make up a smaller proportion of NPK application (9%, 11% and 9% respectively).

DA grazing livestock farms make up the smallest proportion of output (27%), land (18%) and just under a third (31%) of farms out of all LFA farms whilst NPK application is relatively lower (11%, 12% and 14% respectively).

Both figures 2 and 3 demonstrate that the number of farms is not necessarily a good indicator of impact in terms of financial value, land or NPK application.

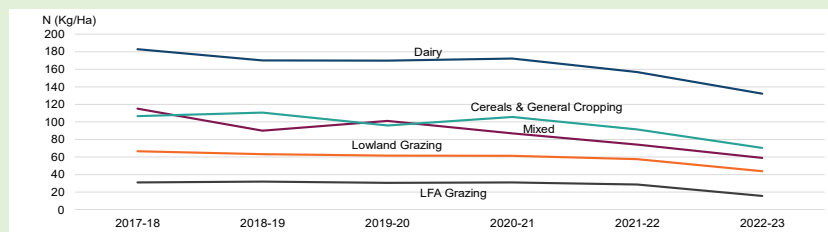
## Farm Level Nitrogen, Phosphorous and Potassium Application

Katherine McGlinchy, Welsh Government

29<sup>th</sup> Pacioli Workshop, Montegrotto Terme, Italy, October 2024

### Longer term trends in purchased, inorganic NPK application

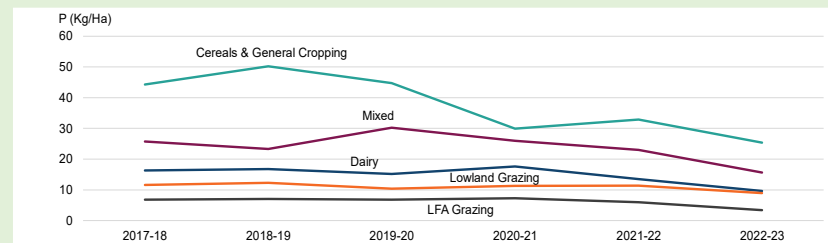
**Figure 4. Average nitrogen application (kg per hectare) by farm type, 2017-18 to 2022-23**



Dairy farms have a considerably larger average application of nitrogen Kg/Ha and sits higher than other all other farm types in the chart across the timeseries (132 Kg/Ha in 2022-23). This is because nitrogen is a key component of protein which contributes to animal milk.

Dairy farms are followed by cereals and general cropping (70 Kg/Ha in 2022-23), mixed (59 Kg/Ha in 2022-23), lowland grazing (44 Kg/Ha in 2022-23) and LFA grazing (16 Kg/Ha in 2022-23). The order remains consistent across the timeseries with the exception of 2019-20 where mixed farms marginally held a higher application rate (101 Kg/Ha) than cereals and general cropping (96 Kg/Ha) but this dropped down to 87 Kg/Ha in the following year whilst cereals and general cropping increased to 106 Kg/Ha.

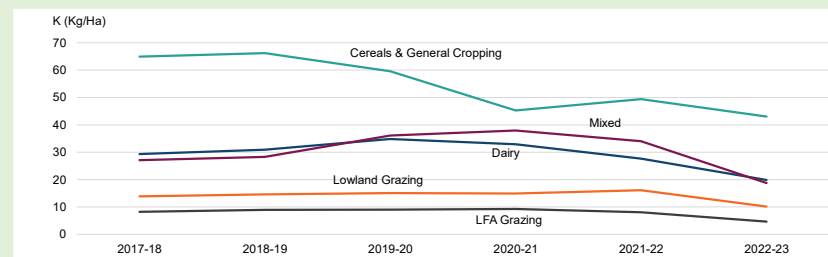
**Figure 5. Average phosphate application (kg per hectare) by farm type, 2017-18 to 2022-23**



Cereals and General Cropping farms have a larger average application of phosphate Kg/Ha than other all other farm types across the timeseries (25 Kg/Ha in 2022-23). This is because an application of phosphate helps to stimulate the growth of roots and shoots of crops.

Cereals and General Cropping farms have a considerably larger average application of phosphorous Kg/Ha and sits higher than other all other farm types in the chart across the timeseries (25 Kg/Ha in 2022-23). This is because an application of phosphate helps to stimulate the growth of the roots and shoots of crops. This is followed by mixed farms (16 Kg/Ha in 2022-23), dairy (10 Kg/Ha in 2022-23), lowland grazing (9 Kg/Ha in 2022-23) and LFA grazing (3 Kg/Ha in 2022-23).

**Figure 6. Average potash application (kg per hectare) by farm type, 2017-18 to 2022-23**

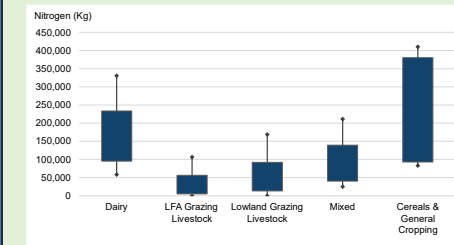


Similar to phosphate, Cereals and General Cropping farms have a larger average potash application, higher than all other farm types across the timeseries (43 Kg/Ha in 2022-23). This is because potash can influence factors such as size, shape and colour of the grain.

Potash can also increase crop yield by boosting root growth, improving drought tolerance. Depending on the year, this is either followed by dairy (20 Kg/Ha in 2022-23) or mixed (19 Kg/Ha in 2022-23) but both farm types share similar trends over the timeseries. Lowland grazing farms hold the next highest application rate (10 Kg/Ha in 2022-23), followed by LFA grazing (5 Kg/Ha in 2022-23). The order remains consistent across the timeseries with the exception of the dairy and mixed farm types.

## Variation in NPK usage within farm type

**Figure 7. Variation of total nitrogen application (Kg) by farm type, 2022-23**

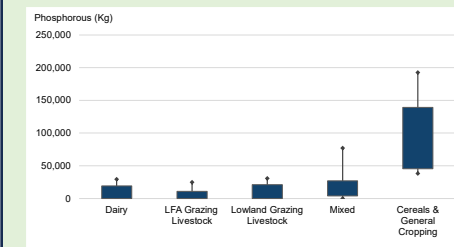


A box and whisker chart showing the variation of nitrogen application within each farm type for the 2022-23 financial year. The top and bottom sides of each box are the upper and lower quartiles (25% and 75%) for the given farm type. Cereals and general cropping farms show the greatest variation whilst LFA grazing shows the least.

Cereal and general cropping farms have shown the greatest range in nitrogen application and whilst the average nitrogen application for 2022-23 was a total of 2.95 million kgs, many farms within that population are applying much more or less than this.

An important feature shown in Figure 7 is that there is a degree of overlap across all farm types. This means that despite cereals and general cropping farms holding the highest aggregate application rate for nitrogen and LFA grazing the lowest aggregate application rate, there are still a small proportion of LFA grazing farms applying more nitrogen than cereals and general cropping farms and vice versa. This is true across all comparisons of the farm types for 2022-23.

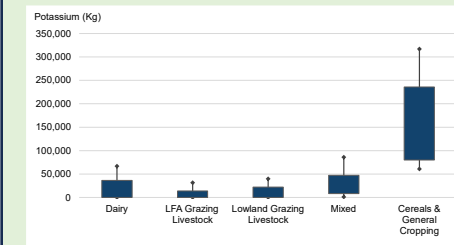
**Figure 8. Variation of total phosphate application (Kg) by farm type, 2022-23**



Similarly to nitrogen application, cereals and general cropping farms show the greatest variation whilst LFA grazing shows the least. Cereal and general cropping farms have shown the greatest range in phosphate application and whilst total application for 2022-23 was 1.06 million kgs, many are applying much more or less than this.

Mixed farms show the second greatest degree of variation whilst the bottom 50% of the population estimates for dairy, LFA grazing and lowland grazing farms reported no application of phosphorous at all. Unlike nitrogen application, Figure 8 does not show overlap across all the farm types. The top 10% (or 90th percentile) of phosphorous application in dairy farms is still less than the bottom 10% (or 10th percentile) of cereals and general cropping farms.

**Figure 9. Variation of total potash application (Kg) by farm type, 2022-23**



Cereals and general cropping farms have shown the greatest range in potash application and whilst average potash application for 2022-23 was a total of 1.8 million kgs, many cereal and general cropping farms are applying much more or less than this.

As with phosphorous application, the bottom 50% of the population estimates for dairy, LFA grazing and lowland grazing farms reported no application of potassium at all. Figure 9 does not show overlap across all the farm types. The top 10% (or 90th percentile) of potassium application in both LFA grazing and lowland grazing farms is still less than the bottom 10% (or 10th percentile) of cereals and general cropping farms.