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Hill farming and water quality

SRUC's 2,200 ha Kirkton & Auchtertyre research and demonstration farms, near Crianlarich, are typical of most hills farms across Scotland. We have 70 ha of good quality inbye grassland, around 150 ha of land that was previously more productive but has now reverted to large amounts of bracken and rush coverage, and around 1,700 ha of less productive grassy moorland. We are atypical in also having 300 ha of woodland on the farms, but more of that later.



Water quality in the uplands of Scotland is generally very good, but hill farmers still need to respect Good Agricultural & Environmental Condition regulations to ensure this status is maintained. On inbye grasslands, this involves applying fertiliser at appropriate times and away from watercourses, to reduce the chances of the fertiliser being washed into rivers. At Kirkton & Auchtertyre we have also fenced off the water margins in our fields under an agri-environment scheme. Although primarily aimed at increasing plant and insect biodiversity in the ungrazed margins, these also help prevent any of the relatively low amount of fertiliser we apply reaching the burns.

Scotland contains around 2 million ha of peatland, the vast majority of which is located in the true uplands and in land of upland character closer to sea-level across the Highlands & Islands. Unfortunately, over 60% of these peatlands are degraded in some way, meaning that greenhouse gases are being emitted to the atmosphere and soil particles are being washed into watercourses. The latter not only discolours water but can also cause siltation and hence damage to the infrastructure associated with public and private drinking water supplies.

At Kirkton & Auchtertyre, we've restored 100 ha of peatland occurring at 350 m altitude by removing grazing pressure from livestock and deer over the last 20 years, and thereby allowing the degraded peat hags to revegetate 'naturally'. More recently, we've restored a further 100 ha at between 500 m and 700 m altitude through working closely with the Loch Lomond & The Trossachs National Park and Scottish Natural Heritage's Peatland Action programme. The 200 ha that we have restored will have markedly reduced soil run-off each year via the many burns on the hill.

We receive an average of 3 m of rain per year which equates to around 66 million cubic metres of water falling across the farms each year. Historically, the vast majority simply fell onto the land and rushed down the hills straight into the headwaters of the River Tay. However, 20 years ago we planted over 200 ha of montane woodland at high altitude (350 m to 550 m) within a 800 ha Highland glen. Our original intent was to establish more shelter for livestock in that glen. But although the trees are there they are growing very slowly and have not yet reached a size whereby we could allow livestock, or deer, into the woodland without damaging it.

Nevertheless, the ground vegetation has really benefitted from 20 years of reduced grazing pressure, with heather, bilberry and tall grassland now carpeting the floor of the glen and contributing markedly to the 'natural' restoration of the peatland within the wooded area mentioned earlier. I have put

'natural' within parenthesis deliberately, because keeping livestock, and especially deer, out of the woodland involves a lot of active management on our part!

The wooded part of the glen is now markedly wetter underfoot compared to before planting 20 years ago. And is certainly much wetter underfoot than the neighbouring glen which has continued to be grazed during that time. We are very interested to know whether the scale of woodland planting has made any detectable difference to water retention capacity between the two glens. At the time of writing, we are in the process of deploying real-time, automatic water depth sensors at the outfall of each of these two glens, with the intent of measuring whether there is any detectable time lag in the rise of these burns after heavy rainfall events.

It will clearly be important that hill farmers continue to take steps to maintain the already high water quality in upland areas into the future. But with increases in extreme rainfall events occurring through climate change, wider society in the lowlands of Scotland will also be looking to hill farmers – and other upland land managers – to manage large parts of their land to help mitigate the impacts of flooding further downstream. We are happy to be playing a small part in considering how best such measures can be integrated into hill farming.

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