Healing the skin? Bandage and ointment



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Content

Threats – chronic and cataclysmic Status Remedies – local first, then global Actions for options – tackle whole system or fail

..... Threats

Chronic gradual, long term - e.g. soil degradation, unbalanced energy/matter cycles, biodiversity loss, increasing eco-toxin load, disconnection of people from land, reliance on food imports

Cataclysmic avoidable - leading from chronic, e.g. US dust bowl, potato famine, food shortage during blockade/war

Cataclysmic not avoidable - e.g. volcanic eruption, nuclear fallout, tsunami, (bushfire)

Britain, Ireland and other seaboard regions of the north-east Atlantic are blessed with a parent rock that weathers into good soil, a moderate temperature that rarely scorches the earth and a rainfall that is enough to support plant growth in most years but not so heavy that it causes loss of soil through direct impact.

So people who have lived here all their lives may be unaware that the 'skin' is punctured and erosion of soil happens almost every day. Erosion here is gradual but long term (or chronic). 'Mud on road' signs and soily outflows from fields after heavy rain may be the only signs that something deeper is happening.

Such chronic erosion eventually leads to an unprotected and structureless soil that is prone to cataclysmic destruction, due to a once-in-a-lifetime deluge or wind storm, for example. Similarly, a region may flood unexpectedly because soil and vegetation upstream have degraded to the point where they no longer retain water.

Such cataclysmic events are avoidable if care is taken to manage soil as a living thing. They can be contrasted with cataclysms such as volcanic eruptions that are not avoidable. Yet the rate of recovery from unavoidable cataclysms will still depend on the health of the soil before the event.

Invading the skin: the beginning

So just once in a while, when we are talking, or eating some bread, using tools or warming ourselves by the fire, we should remember those early people with gratitude, for they were the greatest inventors of all time. EH Gombrich



....Scotland's skin

Massive changes since the last ice (deforestation, extinctions), but lowland agriculture still in the gradual/chronic phase

Where grass is part of the system – soils reasonable BUT in most intense arable parts – serious declines (soil carbon 1%)

Chronic threats not fully recognized – few short-term incentives to apply bandage and ointment (yet repair is possible)

Cataclysmic threats – ability to cope unknown, untested (except 2012, 2016 wet years?)

The 'Greatest Inventors' referred to by Gombrich were the neolithic or later stone age peoples who, among many other achievements, found ways to domesticate the wild in the form of crops and farm animals. They did this in several parts of the world more than 10,000 years ago. Those active in Mesopotamia then moved westwards across Europe, migrating to what is now Scotland, well after the last ice retreated northwards, and finding a land rich in forest and grass.

Then over a span of 5000 years to the present, farming and other human activity here led to removal of most forest, the extinction of many species and cultivation of most low-lying soils. Where grass and grazing have remained in the agricultural sequence, the soil condition, though degraded to a degree, is still above that point where chronic turns to cataclysmic. In some intense arable sequences dominated by potato, vegetables and winter cereals, soil condition may be advancing to the point of no return.

The organic matter in soils is derived from plants. It's what makes soil *soil* rather than dust. The organic matter content declines through repeated heavy cultivation, over-use of mineral fertiliser, yearly removal of most plant material (crops and grass) and exposure of soil to the weather. It can be rebuilt by growing the right balance of crops and incorporating the right sort of plant material. Right balance, right sort? – slide 15.

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What can be done?

No

.....Remedies but at what scale

Some things we can't affect. Some we can...

Local – can only be done here, can't be done from outside (e.g. stop soil degradation, re-balance energy/C/nutrient cycles), producing food rather than feedstocks for alcohol and animals

Global : connected – through external links, importexport balance, import choice, 'no' to external extractivism

Global : disconnected – hard to influence e.g. major GHG emitters, external ecocide

Biologically active soil can be a very thin skin protecting friable and erodible material underneath from the weather above

..... Actions / options

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Personal - food choice, health, re-connect to land.

Local (eco)system - movement to rehabilitation in Scotland and much of the UK possible in five years.

Regional, national – landscape engineering, consumer reconnects with producer, local vs external skinning, develop resilience and prepare for cataclysmic events (which will happen).

Political will & Public buy-in - targeted support (financial etc.), consumer demand for the above.

World - UK's share is small and little expectation of progress among the main polluters



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....bandage and ointment

Bandage

Cover the soil – mulches, undersowing, relay cropping (where one crop leads to the next with little or no break)

Rotation – sequences of crops and grass (leaving soil unturned), agroforestry (stability of tree cover)

Non-invasive tillage – least disturbance to the soil's internal cohesion, allow the 'microbiome' to flourish

Ointment

Legumes – grains like peas and beans, forages like clovers, (deposit nitrogen-rich plant matter)

Diversify plant function – beneficial 'weeds', deep-rooting crops

Organic matter additions – incl. urban-rural recycling (though avoid material with very high carbon vs nitrogen)

Slides 11-13 point to the many things that can be done here to stop damage and heal the skin. Personal choice is becoming a major influence – simply not buying or eating things that are bad for soil, not just here but in other parts of the world.

More direct action is needed and is indeed feasible at two other scales: the individual management unit (field, hillside) and the ecological region (e.g. water catchment). Research and practice in organisations like the James Hutton Institute in Scotland have led to an understanding of the processes of soil formation and soil degradation and the practical methods that can be used to repair damage.

The examples of 'bandage and ointment' on slide 13 are hardly new. The agricultural improvers of the mid-1700s would have been familiar with them. Even if the scientific mechanisms were unknown – the process of nitrogen-fixation by legumes was not understood until many years later – they had experienced the benefits and put them into practice. In the last two centuries, knowledge has been lost, tried and tested methods dumped. Growing legumes almost disappeared in 1930s Scotland.

Repair means not simply reinstating old practices but learning how to apply them in multi-functional cropland and diverse supply chains. The Centre for Sustainable Cropping at the James Hutton has done this in its first sixyear cycle: soil carbon increased, inputs reduced; while the farm as a whole has restored biodiversity and re-connected to the landscape.

Map of fields in Scotland (far right) and two areas (right) showing different landscape patterns.

The blue and yellow colours distinguish fields of different management intensity.

In principle, areas 'at risk' of soil degradation can be identified.





Work by Nora Quesada, Graham Begg, Geoff Squire



William Blake's drawings of Dante's Divine Comedy

From 'The Inscription over Hell-Gate' (right)

Inferno 3

Tortured souls trapped in alternating circles of fire and ice – the INDIFFERENT

Image by *curvedflatlands* taken at the Blake exhibition, Tate Modern, January 2020



While remediation is possible, the size of the task should not be underestimated, even for an area as small as Scotland. The map on slide 15 is derived from data used to apportion subsidy through the EU's Integrated Administration and Control System. Each field can be placed on the map. The crops and grass grown in each field are known. Each field is managed differently. Crop-grass sequences likely to cause soil degradation can be identified.

Responsibility for the repair of fields and landscapes extends well beyond farmers and landowners. Fields are just one part of the food chain and its influences. The Food Chain diagram and its five surrounding spheres of politics, economy, health, environment and society shown on slide 17 (designed by the Centre for Food Policy at City University) places farming and soils as a small part of the whole.

OK – so if soils go then the local food chain goes! True. Yet even the first steps to repair soil need great political will and public buy-in. Subsidy can then be applied in line with results – restored soil carbon, landscape connectivity, and food production for local consumption.

It's not my problem – some say. The talk returned to an extract from William Blake's drawings of Dante's Divide Comedy. Dante and Virgil are looking through Hell Gate. They see (in Blake's interpretation) souls trapped on alternating circles of fire and ice (current cataclysms). In Dante and Blake, these are the souls of the indifferent, the complacent. There's no escape.

DUST BOWL BALLADS SUNG BY WOODY GUTHRIE FOLKWAYS RECORDS FH 5212

Dust pneumonee song

I went to the doctor and the doctor said my son, (repeat) You got that dust pneumonee and you aint got long, not long.

My good gal sings the dust pneumonie blues, (repeat) She loves me cos she's got the dust pneumonie too. 'The pioneering ax and plough rapidly upset the interplay of natural forces that had formed and preserved rich soils The same tide that rolled the frontier forward from the Atlantic rolled back nature's stabilising mantle of trees and grasses and bared virgin soil to weathering ... ' John Asch

More on the dust bowl at www.curvedflatlands.co.uk

Thanks for the invitation and to colleagues past and present whose work is shown here.



More at www.curvedflatlands.co.uk