

Natural Infrastructure Schemes explained



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alliance...**



**National
Trust**

Farmers are in a unique position to restore and protect the natural environment, but there are currently limited commercial rewards for providing natural services from their land, such as flood relief. Green Alliance and the National Trust are testing a concept known as a Natural Infrastructure Scheme, which enables farmers to boost their income by providing these services.

The challenge

Farmers are under pressure to increase production, reduce environmental impact and end their dependence on public subsidy. At the same time, many farm businesses are operating at the limit of their profitability, often to the detriment of soil health, water quality and biodiversity.

Our starting point for creating new markets for sustainable land management is the high cost of floods and water treatment, along with a growing body of evidence which shows that natural engineered solutions to both are cost effective.

We calculate the cost of floods and the treatment of water pollution in England to be £2.4 billion a year, equivalent to £24 million a year for each of the 100 water catchments in England.¹ We believe there could be a considerable market in avoiding these costs by managing land to provide 'slow, clean water' through natural filtration and natural flood management.

There have already been trials of payments for ecosystem services and one off projects. However, the challenges of ensuring fair contributions, delivering services of true value and the lack of appropriate contracting arrangements, have held back the market and stopped this approach becoming mainstream.

¹ A Francis, S Armstrong Brown, W Andrews Tipper and N Wheeler, 2016, *New markets for land and nature*, Green Alliance and National Trust





Our solution

Natural Infrastructure Schemes

A Natural Infrastructure Scheme, or NIS, brings together groups of farmers or other land managers to sell ecosystem services from their land – in the first instance, we are trialling the provision of cleaner and slower flowing water runoff – to groups of downstream beneficiaries.

This would be an area-based market where sellers have a new source of income and buyers are able to avoid the costs of poor water quality and flood defence and remediation. Potential buyers could include water companies (water quality), owners of infrastructure such as Network Rail, the Highways Agency and local authorities (flood avoidance) or reinsurers (reduced insurance payouts).

To develop a NIS, a designer would work with a consortium of land managers to identify the most efficient and effective natural engineering solutions in their particular catchment. They would create a prospectus to offer to downstream beneficiaries.

The price for the NIS is reached through bilateral negotiation between buyers and sellers and should ensure a profitable return for both.

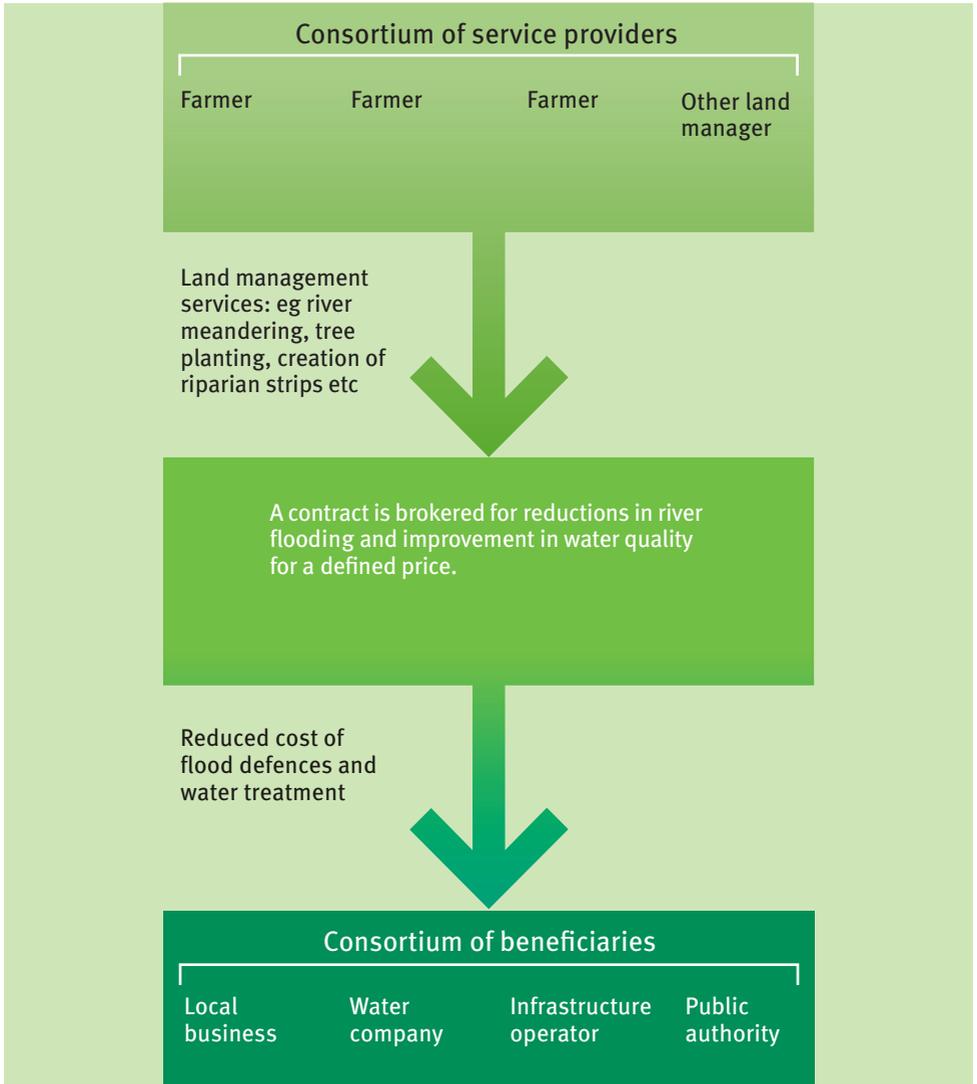
A new type of contract is needed that is fair, legally robust and gives confidence to both sides. In *Funding nature's recovery: how new public spending can unlock private investment* we propose that these are delivered through a new category of private enterprise called Natural Infrastructure Delivery Companies (NIDCs).

NIDCs would be co-operative entities, including both buyers and sellers. They would collaborate to share some of the risks inherent in complex environmental improvement schemes.

We outline the basic features of a NIS in our report [New markets for land and nature: how Natural Infrastructure Schemes could pay for a better environment](#).

How a NIS would work

Landowners in a catchment enter into a contract with downstream businesses and public sector organisations to provide ecosystem services from their land, and to reduce costs incurred to beneficiaries.



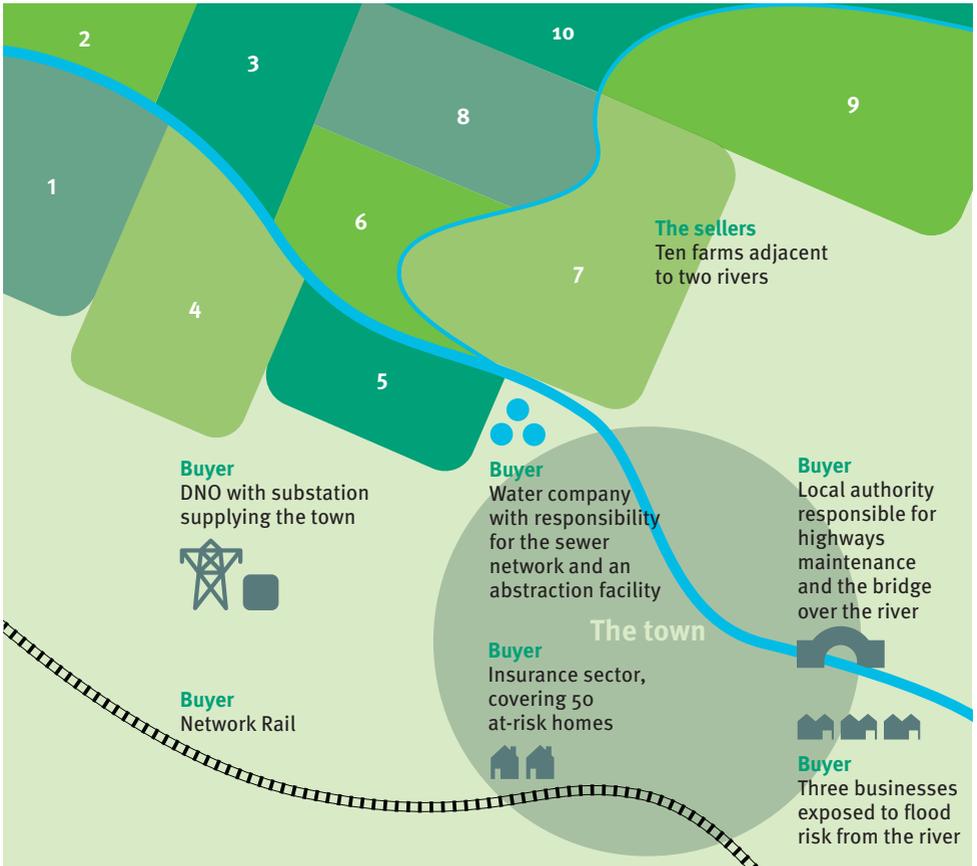


Two examples

Upland farms sell flood protection

In our first thought experiment, one hundred hectares of upland agricultural land on ten farms in north west England are adapted to provide additional flood protection for local businesses and infrastructure up to a one in 75 year flood event. This would cost the farmers involved £6.5 million over the 15 year lifetime of the contract, while saving downstream businesses £11.2 million. This would provide a £4.7 million 'trading space' where a price can be negotiated between the two groups. Splitting the difference could earn an annual profit of £15,000 per farm. This is one and a half times the average net farm business income of an upland grazing livestock farm in England.

An example scheme in the north west: creating holding capacity for 200,000m³ of water on ten upstream farms



Lowland farms sell better water quality

In our second thought experiment, ten arable farmers in the east of England adapt their winter planting arrangements on 1,000 hectares, growing cover crops on half of the area and switching crops and cutting fertiliser use on the other half. This could reduce nitrate pollution by enough to avoid the need to build a new drinking water treatment plant. It could also improve the resilience of local food and drink supply chains by restoring soils and securing local water sources.

Unlike the upland livestock farms, these arable farms are some of the most profitable in the country, but they could augment their profits further through this scheme. It would cost the farmers £3 million over 15 years, taking into account reduced yields, the cost of cover crops and savings from lower fertiliser use and soil erosion. The water company could save £4.5 million in avoided water treatment costs. Splitting the difference could return total profits of over £0.7 million to the farm consortium across 15 years, equivalent to nearly £5,000 per farm per year.

There is potential to introduce other buyers, such as local food and drink companies reliant on the local water source. Sharing the purchase could make the contract a more attractive prospect for the water company, increasing its estimated saving from £0.75 million to £2 million.

The upland farm example is outlined in [Natural Infrastructure Schemes in practice: how to create new markets for ecosystem services from land](#). The study of lowland farms features in [Protecting our assets: using Natural Infrastructure Schemes to support sustainable agriculture](#).



What makes a NIS special?

The NIS concept builds on other payments for ecosystem services schemes but it has several distinctive features:

It is farmer-led which means it can be planned to fit alongside and enhance other farm income streams.

Long term, large scale contracts allow ecosystem services to move from being peripheral to core income earning activity. These mean projects are delivered at sufficient scale to ensure effective solutions for buyers.

Payments are for results not the uptake of land management practices which means farmers take on more of the responsibility for delivering environmental outcomes and can tailor interventions to suit their land and business.

A bigger, more diverse set of buyers lowers the barrier to entry, enabling more markets to be developed and making it harder to free ride on payments made by others.

Expanding the concept to other services

Other buyers could be brought into an existing NIS to fund additional ecosystem services such as public recreation, more specialist habitat management or landscape enhancement at relatively low marginal cost.

The basic NIS concept can also be expanded to other types of ecosystem service, for instance carbon sequestration or, when the physical and mental health benefits of nature are measured, payment for its provision for health.

Multiple benefits could be packaged and sold together. This would attract more buyers, allowing for more and larger land management interventions.

In some cases, it could increase the overall environmental value of interventions too. Funding tree planting rather than bunds for flood relief, for instance, could provide other purchasable services like carbon sequestration, recreation and biodiversity enhancement.

Mechanisms for packaging multiple benefits are explored in [New routes to decarbonise land use with Natural Infrastructure Schemes](#).



A role for government

The aim eventually is to create a self-sustaining NIS market. However, government support could greatly increase the speed with which this is achieved.

We have identified three types of government support that could kickstart the market:

1. Financial support

Progress on developing institutional arrangements for a NIS and similar schemes will be slow without public money. There are knowledge gaps, for instance around the effectiveness of natural flood management at catchment scale, and a lack of any farming and soil equivalent of the Woodland Carbon Code that would enable carbon credits to be sold. Finally, the government could offer to match fund private investments in early NIS projects, helping to reduce the risks for participants and gather evidence to improve future schemes.

2. Remove policy and legislative barriers

The proposed new Environmental Land Management scheme should enable public and private payments to work alongside each other. The government could help to overcome legal hurdles. It could facilitate the derogations, permits and licences required and make clear that farmers will not be penalised for using some of their land to provide ecosystem services, such as losing their exemptions for fuel duty and inheritance tax.

3. Additional measures to support markets

The government should use policy to create local and national demand for the purchase of environmental benefits, like flood mitigation or carbon sequestration. It should also support the formation of new markets by introducing formal accreditation of independent brokers of the services required.

How the proposed Environmental Land Management scheme could support a NIS is described in more detail in our report [Funding nature's recovery: how new public spending can unlock private investment](#).

Further reading



New markets for land and nature:
how Natural Infrastructure Schemes
could pay for a better environment
September 2016



Natural Infrastructure Schemes in practice:
how to create new markets for ecosystem
services from land
September 2017



Protecting our assets:
using Natural Infrastructure Schemes
to support sustainable agriculture
December 2017



Funding nature's recovery:
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**New routes to decarbonise land use with
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February 2019

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Green Alliance

Green Alliance is an independent think tank and charity focused on ambitious leadership for the environment. Since 1979, we have been working with the most influential leaders in business, NGOs and politics to accelerate political action and create transformative policy for a green and prosperous UK.

National Trust

The National Trust is Europe's largest conservation charity, with six million members. It is the UK's largest private landowner and farmer, with a total of 250,000 hectares of land and 775 miles of coast across England, Wales and Northern Ireland. Under our ten year strategy, we are committed to developing innovative ways of managing land which are good for farmers, the economy and the environment.

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An aerial photograph of a lush green landscape. The foreground is dominated by vibrant green fields, some of which are separated by stone walls and clusters of trees. The middle ground shows a mix of green fields and some brown, tilled earth. In the background, rolling hills are visible under a clear blue sky with a warm, golden light, suggesting either sunrise or sunset. The overall scene is peaceful and scenic.

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