

# Growing the South Hams Food Economy

A report for South Hams District Council

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# 1 Executive Summary

This report was commissioned by South Hams District Council to assess whether the area and its tourist visitors could become self-sufficient for food, grown to the most sustainable standards, and if so, consider the efforts that would be needed to make that happen and the likely outcomes. Food is widely recognised as being one of the largest global contributors to climate change and biodiversity loss, thanks mainly to how we farm, transport, packaging and wastage. The report considers how a localised food economy could address these issues.

*The author and SHDC wishes to convey sincere thanks to Bridport Town Council & Ele Saltmarsh for allowing us to use their report [ref 17] as the blueprint for calculating population food needs.*

To summarise, the South Hams area has enough suitable land to grow up to 5,000ha of horticultural crops (current area is 410ha), 18,000ha of arable crops (around 15,000ha at present), to feed us and the farm animals that will be needed in our mixed farm landscape with the remaining 40-50,000ha as grassland, our natural #1 crop, or planted with trees and / or re-wilded.

The report looks at a variety of aspects of food production and consumption across the district and concludes that there is more than enough land to feed our 89,000 residents and 2.8m visitors (that's the number of nights recorded), based on a daily diet fortified by a 30% rise in vegetables & fruit, 50% rise in fibre and a 30% reduction in meat (only 20% cut in beef & lamb, our 2 talismanic cuts), mostly in line with national dietary guidelines.

It considers the likely amount of each food type we could and should consider growing here and concludes that an 80% self-sufficient diet will stretch our palettes & production capacities as far as they can be stretched – 100% of our cereals but only 10% of our Sugar (likely in the form of honey and flavourings).

The report recognises that the driver to any such change starts with our citizens asking for and buying this food, which in turn creates an unmet demand that our farmers will react to and pivot their businesses away from the current model to servicing the demand on their doorstep. It also recognises that the main connections between tackling Climate Change and Food in the public mind are to recycle packaging and cut food waste. Lots of public engagement will be needed to convey the myriad of other reasons why creating a new Food paradigm (that includes that switch to more Veg, less Meat), between us all will help reach Net Zero together and bring economic & social benefits at the same time.

It looks at current attitudes in the UK and at the Westminster government's net zero policies and finds that the majority of people know that they will have to change their lifestyles to some extent and probably spend more in doing so, but would find it easier if this were done collectively and it would actually work. The South Hams population has long had within it a visible cohort of people who grow, sell and buy local organic food but we would need everybody to be engaged and happier as a result.

The focus is on the development of a localised food economy and not the wider issues of Food Security as there is a great deal of research and literature on this. It does however consider how a new food system can share the work fairly across the area.

In conclusion, we have the farmland here to feed ourselves organically at 80% self-sufficiency, and if we did, this could lead to enough carbon being stored in the soil in the next 2 decades to offset 25% of our GHG emissions, by when the trees we are planting now will take over most of that heavy lifting. So net zero for the sector becomes reachable. It could also lead to over £200m of our food spend circulating in our local economy as shop pays farmer, farmer pays worker, worker pays rent & buys milk etc. We use a local multiplier of 2.5 to calculate the value of £10 spent on local food (ie £10 becomes £25 value locally), versus the current food system where the multiplier is 0.25, (ie £10 becomes £2.50 retained locally & £7.50 leaves the area to pay for the goods, transport, packaging etc).

## 2 Policy Context

South Hams District Council (SHDC) declared a Climate & Biodiversity Emergency on 25th July 2019 and soon after, set up a Working Group, reporting to the Climate Change portfolio holder, with the aim of helping the Council area reach net zero by 2050. The Council has also published its SHDC Climate Change & Biodiversity Strategy<sup>1</sup>. In that, the Council committed to:

- Reduce its own emissions to net-zero by 2030
- Work with others through the Devon Climate Emergency Response Group (DCERG) to reduce SHDC region carbon emissions to net zero by 2050 at the latest
- Commit to a 10% biodiversity net gain of its green and wooded public open space by 2025.

With regard to the second point, working with others, the DCERG released its Devon Carbon Plan<sup>2</sup> on 27th Sep 2022, which the SHDC signed up to, committing to work with partners through the DCERG.

The SHDC Strategy, mentioned above, is a useful document, written in the time of Covid, that has lots of positive strategies around Homes, Heating, Renewables and Woodland & Tree planting, but very little about Food, bar the need to reduce our Meat consumption & to stimulate the local food economy, (4.1a, “encourage individuals to look at the impact of their diet & consider reducing their meat consumption, and increase the proportion of in-season, locally grown food eaten across Devon), and for farmers and citizens to look at alternatives to herbicides & pesticides, (3.12, To form part our communications work in the first instance). Growing, transporting & cooking of Food is responsible for 1/3 of global GHG emissions [ref 3], and each of us makes decisions on what to eat & where it’s from at least 2 or 3 times every day. Food is possibly the easiest way to engage with the public on climate change & lifestyle changes.

Since the Strategy was written, we have seen the signing of several overseas trade deals that threaten future UK farm incomes [ref 4] (with likely adverse knock-on economic impacts across our rural communities and potentially, longer food supply chains bringing us food produced to lower environmental & welfare standards), and extremely difficult growing conditions here, with 2 Summer droughts followed by a very wet 12 months [ref 5]. What are we to do? Could we re-engineer our local food economy to reduce GHG emissions, engage our citizens & visitors with positive actions on climate & biodiversity, bolster our local economy and at the same time, give our farmers & rural communities some stability to plan investment & adapt to the 1.5°C rise in global temperatures that our net zero goals are built around?

Research by campaigning charity Sustain [ref 6], into the effects of growing localised food markets suggests we could, they deliver much social, environmental & economic good, and the Devon Carbon Plan (DCP) [ref 2], has a detailed section on Food, Land & Sea [ref 7] which opens by stating:

“ ... how Devon balances concerns for food production, and security, and the need for its land and seas to store more carbon and do more for wildlife, is a crucial element of our response to the climate and ecological emergency”.

We will look later at how a plan to grow our local food economy aligns with this section. Before we do, we should take a look at the UK National commitments to combat CC with regard to food, farming & fisheries and note how they align with the DCP, and before that, understand what powers & influence SHDC as the Local Authority here has, what can we do? In summary, be Bold. The UK Climate Change Committee, (the CCC) recommends that “local authority plans should include a high level of ambition for emissions-reductions, and focus on emissions drivers & adaptation activity over which local authorities have control or influence”. Be Bold.

The SHDC Strategy considers the distinct areas of action the council can act on, and these are:

- Areas we can directly control/guide – food markets, environmental health, waste, housing, strategy, planning & some funding

- Areas we can enable through funding – things that help mitigate or adapt to CC, especially that align with the DCP
- Areas we can enable through policy and regulatory systems – needs exploring
- Areas we can influence locally – grant help, involve & harness the energy of community groups, parish & town councils, establish a Sustainable Food Place for the South Hams
- Areas we can influence nationally through request and lobby – steering group of the Devon Food Partnership (the DFP), neighbouring local authorities, engage our MPs, apply for funding, engage with the Local Net Zero Forum.

## 2.1 Food and Climate Change & Biodiversity Loss

The UK Climate Change Committee has been nominated by Parliament to monitor and report annually on the UK's progress towards its own Climate commitments. It publishes an annual Report to Parliament, with recommendations for each Whitehall department and the devolved governments. The most recent one was released in June 2023. They also publish, every 5 years, a UK Carbon Budget.

The committee states that Food & Agriculture contributes 11% to the UK GHG emissions, (food transport, packaging & manufacture appear elsewhere in the Carbon budget), and this needs to fall by 29% by 2035. Last year's progress report said the UK is in danger of missing its current targets and if that carries on, will be way out of line for the 6th Carbon Budget which covers the years 2033-2038.

With regards to Food & Agriculture, their main criticisms were, (but not limited to):

- The Government's current strategy has considerable delivery risks due to its over-reliance on specific technological solutions, (p.prox.. 1/3 of planned future emissions reductions), some of which have not yet been deployed at scale. The CCC calls for policies to 'develop demand-side and land use policies', ie stop putting faith in unproven technologies and start to stimulate demand for Carbon positive food and install policies that encourage farmers to pivot their land and businesses towards this market
- DEFRA (the Department for Food & Rural Affairs), are lagging on their plans for peat restoration & for stopping the use of peat in horticulture
- The English Land Use Framework, promised by DEFRA in 2023, has not been published
- No plans are in place to reduce artificial Nitrogen use
- DEFRA needs to set out how the objective in the Government Food Strategy (GFS) [ref 9], to 'deliver a sustainable, nature positive, affordable food system' will be achieved, including the mechanisms to address the interaction between food systems and other land use needs, climate, nature, and integrated alongside a public shift towards low-carbon diets
- Still no deposit return scheme for food & drink packaging

In Devon, our plans are more developed it would seem. We have the DCP (led by the County Council along with Torbay & Plymouth Councils), which has a significant section on Food, Farming & Fish, (Chapter 11, Food, Land & Sea). The DCP notes that emissions from Agriculture, Forestry and Other Land Use (AFOLU) accounts for 19% of the total in Devon (rather than the 11% listed above by the CCC), mainly due to the number of ruminants we have here. It is likely that the SHDC area mirrors this though detailed data is unavailable.


Three main changes are needed to reduce the GHG emissions from food, land and sea. Devon's farming and fisheries businesses are at the core of delivering the solutions:

**Three Main Changes Are Needed To Reduce Emissions In This Area:**



**Develop Demand For Nutritious And Sustainably-Produced Food.**

We need to use our spending power to support local farmers, fisheries and horticulture that demonstrate best practice, and eat less red meat and dairy.



**Reduce GHG Emissions And Improve Carbon Storage From Farming.**

Practices that enhance soil carbon should be adopted, including regenerative practices, agroforestry and pasture-based livestock farming. Farm machinery should use renewable fuels, and emissions from manures, wastes and fertilisers must be reduced.



**Maximise Carbon Storage In The Environment.**

We need to protect and enhance existing habitats and ecosystems, and create new ones, which store carbon. This could include planting trees, restoring upland peatlands, and focusing on other habitats in Devon such as hedges; wetland habitats such as reedbeds and valley mires; wet Culm grasslands; soils; salt marshes and mudflats; and sea grass meadows and kelp beds.

By making these changes and enhancing the environment, we will help to address the ecological crisis, minimise flood risk, improve water quality, and encourage eco-tourism by contributing to Devon's beauty and appeal. On an individual level, eating nutritious and sustainably-produced food will improve health and wellbeing, as will having greater contact with nature.

## 2.2 SHDC and Food Policy

SHDC has secured over £3m of Government funding, some of which is being used to help transform its agricultural sector through decarbonisation, regenerative farming, the piloting & adoption of new & emerging technologies. It recently held a symposium on Food and Agriculture and has also appointed a Food & Agriculture Officer to lead on a range of projects that support our farming, food & drink sectors.

The Council has ambitions to:

- ensure that food miles are reduced as far as possible
- create a circular economy which links local producers to local customers
- help increase the range of businesses which operate from SHDC marketplaces

It is now considering what a move to a localised and mainly organic food system over time would achieve and can it even be done? This report aims to achieve answers to both those questions and consider how we might start and how far we should go towards self-sufficiency.

## 2.3 Devon Carbon Plan and SHDC

The DCP has a list of affirmative actions for various actors, including local authorities. For the purposes of brevity we have not listed the actions that are applicable to the County Council.

	Devon Carbon Plan	South Hams Food Economy Plan	Aligned?
<b>Local Authorities</b>	Support the Devon Food Partnership	Yes, SHDC presence on steering group & 'Growing the Local food Economy' group	Yes
	Work with government to support new initiatives including a food labelling system showing environmental impact & preferential trade tariffs to food products that demonstrate minimum food stds	Our food labels will mostly say "Organic" on them, showing an equivalence with Organic imports & indicating lower environmental impact	To some extent
	Work with government to design an effective Environmental Land Management Scheme that will ensure food production alongside carbon storage and other public goods	Willing to work with government while working with farmers & citizens to design an effective Environmental Land Management Scheme here	Yes
	Look to set-up a Devon Farm Advice Service	South Hams has funded the Agri-Innovation Programme and projects in the Devon Agri-Tech Accelerator (DATA) using existing	Yes

		service providers	
	Support the testing and adoption of low-carbon agricultural practices, and explore how this could be demonstrated on the County farms estate	Supporting the conversion of land to organic practises by stimulating the markets and distribution. Willing to assist County Council with joining the market	To some extent
	Develop a Land Use Framework	The Plan starts with assessing the agricultural capacity of the land across the South Hams and working to produce appropriate crops & animals in line with environmental limits	To some extent
	Support the development of carbon storage accreditation schemes for a range of carbon-rich terrestrial, coastal and marine habitats	Needs investigating and work with the County Council. Long term monitoring of soil carbon levels through organic conversion and in production will indicate value	To some extent
	Allocate land for horticulture near settlements in development plans where suitable	Needs agreement with planning Office. The Food Plan will include production from within settlements (bakeries, kitchens, urban growing - fresh leaves & herbs for instance), and farm & smallholder production on the urban fringes	To some extent
<b>Everyone</b>	Aim to have a diet that follows the government's Eatwell Guide, which requires us to eat less red meat and dairy	Planning for demand based on the Eatwell guidance	Yes
	Where possible, choose to eat food that is sourced locally and sustainably-produced	Plan includes informing citizens & promoting local & organic food (as the default choice for 'sustainably-produced' food). Facilitate more retail & catering through the hub system & supporting new retail start-ups	Yes
	Be mindful of your impact on the environment, and treat it with care when out and about, following the Countryside Code	Shorter supply chains and larger share of retail value retained at the farm gate will help unite urban communities with the land around them, encouraging more citizens to spend time in the countryside	Yes
<b>Communities</b>	Set up a local farmers market or community shop	Plan starts with supporting a Not-for-profit retail & wholesale business at Dartington as the first of several such projects	Yes
	Offer cooking skill share sessions to reconnect people with local seasonal food	Possible with the first site at Dartington. Celebrating new season crops will include serving it in the eateries on site, along with recipes & tasters	To some extent
	Help people to eat a sustainable balanced diet at your events	The Plan includes much messaging and sharing of information at Community level	Yes
	Take action to protect and enhance local habitats and wildlife – get inspired with Wild About Devon	The Plan is intended to encourage thousands of hectares to be converted to Organic standards, which will lead to more biodiversity across the area, joining up many of the Wild Spaces being created	Yes
<b>Organisations</b>	Consider buying local through the South West Food Hub	Now defunct, but the SHDC Plan takes inspiration from the South West Food Hub	Yes
	Provide meals in your eateries aligned to the government's Eatwell Guide	Large increase in caterers procuring & serving food through the Hubs	Yes
	Incentivise sustainable food-practices through procurement procedures	Organic-first policy will deliver sustainably produced food & sustainably managed farmland	Yes

### 3 Benefits of a Local Food Economy

Localising a significant part of the SHDC area food system, with shorter supply chains & with organic standards as the default choice, could bring significant benefits to the area in terms of the economy, society and the environment, Climate & Biodiversity benefits (including citizen engagement in tackling CC), in bold:

Economic Benefits	Societal Benefits	Environmental Benefits
Farm incomes improve – a larger share of the retail value is returned to the producer, thanks to fewer links in the chain	Jobs created on farms and in rural areas to produce, process, pack and deliver food	More land gets converted to Organic farming, leading to more <b>biodiversity</b> , see Soil Association report <sup>10</sup>
Farm incomes – farm support levels for organic farming are good and on-going	Jobs created in rural areas to supply goods & services to the food producers	More <b>Carbon</b> is sequestered in organic soils than in non-organic land, helping offset emissions elsewhere across the area
More money retained here – Sustain report <sup>6</sup> indicates a ten-fold uplift. 25p of a food £1 is retained locally when spent in a supermarket Vs £2.50 when £1 is spent in a locally controlled retailer selling locally produced food	Cultural preservation from celebrating, sharing & enjoying South Hams food – making a direct link to the area, <b>its soils</b> , farmers and animals	Reduced <b>food transport</b> . Most of what Devon produces is sent out of the County, most of what we eat is produced out of Devon. Locally produced & sold food should emit less than half the emissions from transport
Opportunity to add value at farm level – currently Devon farms supply raw materials for businesses to add value to. By joining up, our farmers can process, pack, store & deliver more value	Community health & wellbeing from a fairer distribution system that can offer access to & <b>engagement</b> with local and organic food to more of our citizens	Short food chains & farmer’s markets present the opportunities to create <b>circular systems</b> for food packaging, and even use less or no packaging
Rural businesses that supply successful farms will benefit from selling their services & products, retaining more money in their community	Climate Relief rather than Climate Anxiety – <b>give our citizens some agency</b> to choose food that reduces their climate impact, and see benefits on their doorsteps – more wildlife and a more secure food supply	Farms making profits will invest in their land & capital items like Winter rain storage reservoirs & lakes that can take <b>flood pressure</b> off our rivers & towns in their paths
An area with a colourful, thriving food scene and recovering soil, woodland & biodiversity levels at its heart is a great draw for tourists to visit & spend	Opportunities to make <b>strong connections</b> between our urban communities & the farms around them, creating cohesion	Better drainage and better soil moisture retention as a result of raising organic matter levels
Opportunity to <b>link carbon &amp; biodiversity</b> net gains to farm payments & communities		<b>Lower GHG emissions</b> resulting from using less artificial Nitrogen.



## 4 A Question of Scale

As well as how much food could the SHDC area produce, using Organic methods, we need to consider how much is consumed by our citizens, our visitors and our neighbours (and their visitors).

Supplying the urban areas to our Western & Eastern edges, (Plymouth & Torbay respectively) means considering the logical conclusions of localised food markets, created either by design or by need – that our farmland within the SHDC would be called on to supply not only our own needs, but also (with others), supply the large conurbations around us with most of their food & drink needs. For Plymouth, this means sharing supply with Cornwall & the West Devon Council district. For Torbay the load would be shared with Teignbridge. Similarly, the towns of Buckfastleigh & Ashburton (both in Teignbridge area), might best be served by a distribution hub near Buckfastleigh, where there is already a significant organic food industry with Riverford Organic Farmers Ltd at its heart.

This adds to the complexity of the question of how much can the 886km<sup>2</sup> of SHDC area produce in a 12 month year?

There are several challenges to calculate the answer to this question:

- What are our soils like? (see next section)
- How capable are they of producing a complete diet, adjusted to account for an engaged population eating 20-30% less meat & dairy, 30% more fruit & Veg, 50% more fibre and 25% less High Fructose Sugar Syrup (HFSS), (this guidance from report National Food Strategy part II [ref 11])? (see section 7)
- Who are we feeding? As hinted at above, there are 4 scenarios to consider:
  - *scenario 1*: SH residents fed at 100% self-sufficiency (i)
  - *scenario 2*: SH residents plus appropriate shares of neighbouring urban areas (ii)
  - *scenario 3*: SH visitors, fed entirely on local food & drink (iii)
  - *scenario 4*: Appropriate share of feeding visitors to Torbay, Plymouth & Teignbridge
- The answer will be based on using estimated yields for organic produce in an attempt to build a system that is sustainable (ie fewer inputs, more nature & more positive climate impact from rebuilding soil carbon levels).

## 5 The Soils of the District

The area is blessed with a wide range of soils, capable of growing a full range of crops and a usually benign mix of climates. Assessing the agricultural capacity of our soils can generally be done using 2 widely adopted systems of Soil Classification. For this report, we will use UK Soil Observatory Soilscales to assess the agricultural capacity. There is also a system called the Agricultural Land Classification, (ALC, see appendix 1.), which will be more familiar to a lot of farmers & citizens. It was produced in the 1960s by Ministry of Farming & Fisheries (known then as MAFF, now Defra, the Department of the Environment, Food & Rural Affairs), using a low intensity system of surveying. The Soilscales series has developed since and superseded the old Grades 1-5 classifications of the ALC. While the Soilscales series describe the soil type, rather than the usefulness or otherwise of a soil, there is often overlap between the two, the best soil grades relate to the best soil types.

### 5.1 Farming Zones

We have 3 main farming zones:

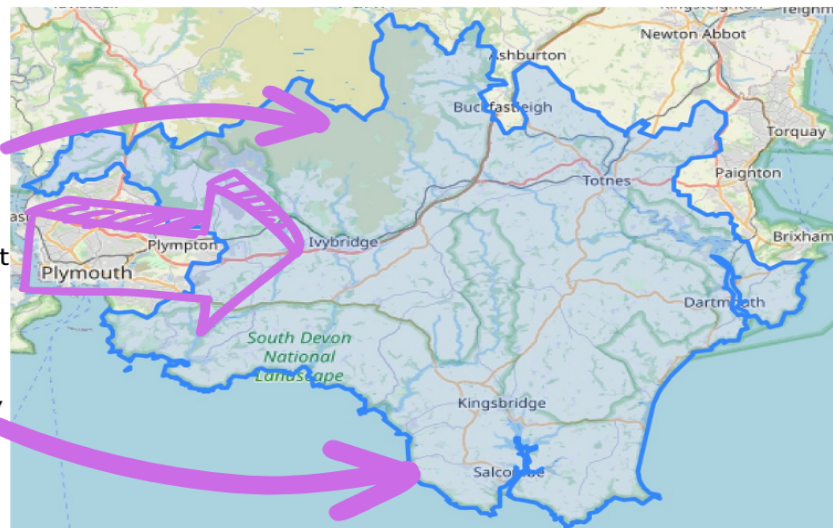
- To the North, the 'Wildscape' of the Southern edge of Dartmoor, with high rainfall, long Winters & land which lends itself to mainly grazing & forage, with pockets of arable and horticulture. Restoring peat levels up here offers the potential to achieve large amounts of carbon storage.
- Through the middle lies a belt of productive farmland suitable for all crops and animal production, including pigs & poultry, provided that environmental limits are recognised & overstocking is avoided. This area is capable of serving the area's 3 major towns, Ivybridge, Totnes & Kingsbridge, with combined populations of nearly 26,000 – pprox.. 30% of the SHDC total.
- The Southern flank is a combination of coastline, river carved valleys and downlands. The farmland is still productive but often light & subject to more environmental limits, with a lot of it falling within Areas of Outstanding Natural Beauty (AONBs).

#### South Hams 3 farming zones

Dartmoor flanks,  
the 'Wildscape'

Fertile central belt

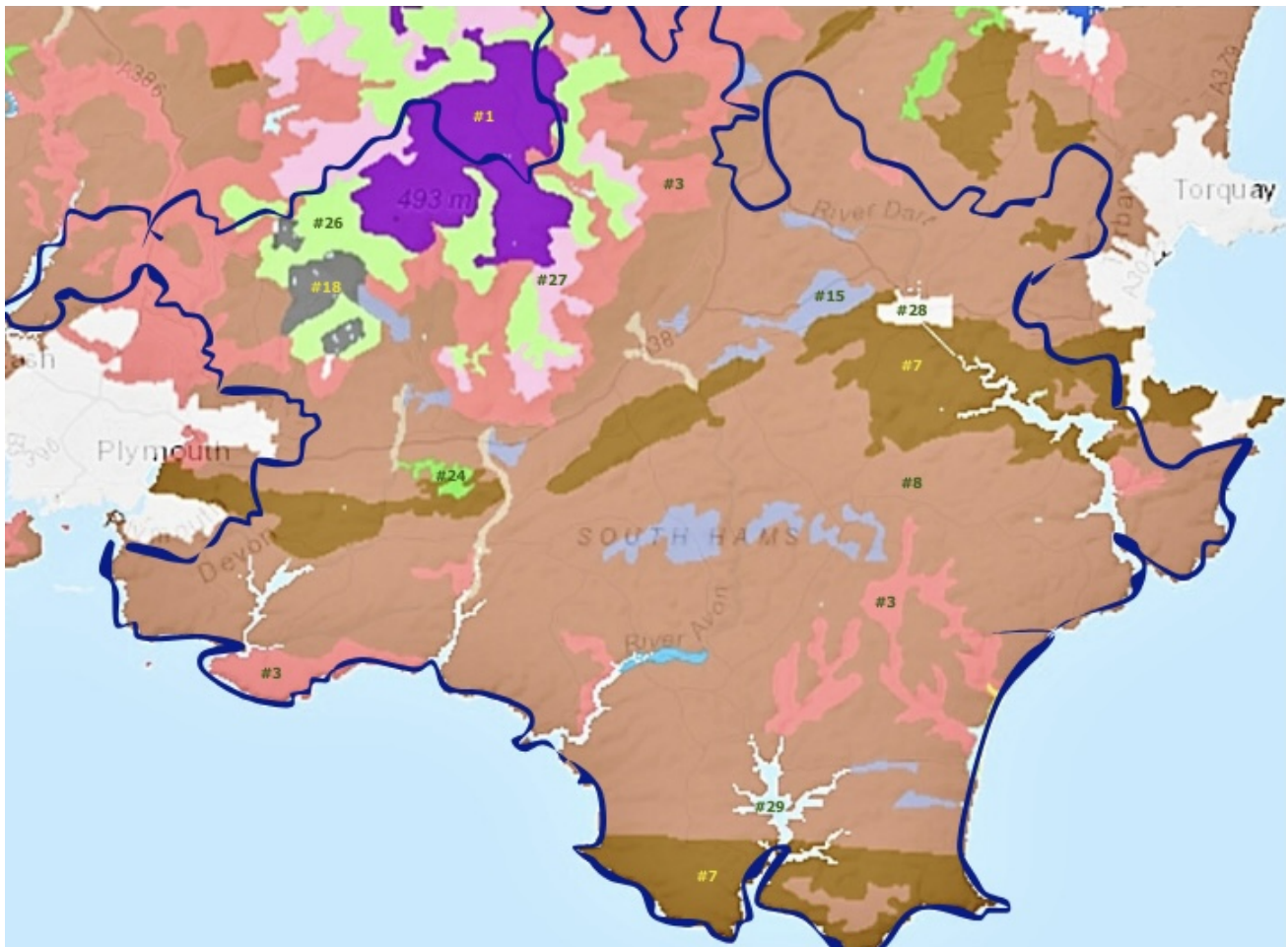
Southern flanks,  
beaches, tourism,  
downlands  
& the Sea



### 5.2 Soil Types

The UK Soils Observatory (UKSO) lists a range of what they call Soilscales, to describe the 29 distinct soil types that make up the UK. We have 9 of them, sadly not one of them are the prime lands that you would pick from the deck for your area if you had a choice, but our landscape would be radically different and it wouldn't be South Devon.

The Soilscape map below shows the lay of the land, from the bogs (coloured purple), of the High Moor through the lush pastures in the middle & the sides down to the beautiful coastal areas where arable downland & our five river valleys meet the sea.



The complete Soilscape colour and number codings are defined in Appendix A. Those of particular interest for the South Hams are:

3	Freely draining acid loamy soils over rock.
7	Freely draining slightly acid but base rich soils.
8	Slightly acid loamy & clayey soils with impeded drainage.
15	Loamy soils with naturally high groundwater.

**Soilscares #15 & #8** account for nearly 60% of our 70,000 ha of land, (out of a total land area of 88,600ha). These soils lend themselves to the full range of cropping & livestock that we would need in the local food economy, with large caveats for building fertility, minimising nutrient losses into streams & watercourses, long rotations when including horticulture and an emphasis on reducing soil disturbance.

**Soilscares #3 & #7** cover another 17% of the region, again they lend themselves to a mix of outputs, with bigger caveats to seasonal grazing, cultivations and livestock choices.

The remaining 23% cover:

- the High and lower edges of Dartmoor including 2-3,000ha of quarry waste which has the potential be repaired and made more useful over time.
- the towns & villages, that will be consuming most of the food.
- The rivers, that drain the moor & our farmland and create most of our tourist hot-spots.

SS #	Description	Where?	Suitability	% Area	Gross area ha	Farm land area*	Live-stock only?	Arable?	Veg?	Notes
# 8	Slightly acid loamy & clayey soils with impeded drainage	Spread across the piece below the Moor line or lower cliff areas	High fertility, often drained, suited to grazing, Autumn sown cereals, useful carbon sink	49%	43,000ha	35,260ha	No	Yes	Yes	Surrounds all main population centres, useful for most food production, fertility needs carefully building
# 15	Loamy soils with naturally high groundwater	Main band Modbury to Halwell + West of Totnes	Low fertility, mostly arable & grass but useful for roots & spuds, best with drainage.	12%	10,500ha	8,610ha	No	Yes	Yes	Useful soils, need feeding & long rotations to include roots & brassicas
# 3	Freely draining acid loamy soils over rock	Noss peninsula, Valleys to Slapton & Kingsbridge + Moor's edge & above Plymouth	Low fertility, often steep, grass & year round grazing possible. Hungry for carbon	9%	8,300ha	6,806ha	No	Yes	Yes	Combination of low intensity conservation grazing with considerate horticulture & fertility building
# 7	Freely draining slightly acid but base rich soils	Broad seam from Plym to Paignton via Totnes + Soar & Prawle peninsulas	Loamy, high fertility, drain freely into streams & groundwater, arable, some veg, outdoor pigs & poultry (with N limits), hungry for carbon	8%	7,000ha	5,740ha	No	Yes	Yes	Useful soils for outdoor pork, poultry & eggs, all subject to environmental limits, big opportunities to improve C levels
# 27	Very acid, loamy upland soils with a wet peaty surface	South Eastern flanks of the lower Moor	Grazing & forage only, out-wintering with care. Should be high carbon soil already	7%	6,300ha	5,166ha	Yes			Mix of grazing and silva-pasture possible, sink for C needs investigating
# 26	Slowly permeable, wet, very acid upland soil with a peaty surface	Mainly on Moor flanks	Grazing & forage only, out-wintering with care. Should be high carbon soil already	4%	3,600ha	2,952ha	Yes			Large areas below the High Moor should have high carbon levels, needs evaluating
# 18	Restored soils mostly from quarry or opencast spoil	South West of Moor around Shaugh Prior	Poor structure, liable to compaction, grass & some arable possible. Ripe for re-carbonating	2.8%	2,500ha		Yes			Needs investigating & restoration projects possible. What legacy have the quarry Co's left us?

# 28	Urban areas	Towns & villages	Opportunities for urban horticulture	2.8%	2,500ha				Yes	Opportunities for community engagement & urban growing – many routes to market
# 1	Blanket bog peat soils	High Moor	Seasonal extensive grazing only, opportunities to improve carbon levels & rewild	2.4%	2,200ha	1,804ha	Yes			The high peaks of the South Hams, investigate C levels and work with others to plan peat restoration
# 24	Slowly permeable, seasonally wet, slightly acid but base rich loamy soil	Ermington area only	Impeded drainage, grass with some arable & forestry. Seasonal grazing	1.1%	1,000ha	820ha	No	Yes	Yes	Investigate this area, is potential re-wetting possible?
			<b>Totals from above – raw data</b>		<b>88,600ha</b>	<b>67,158ha</b>	<b>9,992ha</b>	<b>57,236ha</b>	<b>57,236ha</b>	
			<b>Likely usable land – arable likely 2/3 of areas above &amp; Veg on 40% the area above</b>				<b>9,992ha</b>	<b>38,157ha</b>	<b>22,895ha</b>	

**Farm Land Area** (\*) assumes approx. 15,000ha of the non-urban land area is unfarmed – DEFRA records (ref 14) say there are 1043 farms using 70,500ha. Deducting 100 farmers and 3,500ha of land for Plymouth & Torbay rural areas, leaves 67,000 ha of farmland in the South Hams

### 5.3 Potential usage of South Hams Soils

In summary, the 22,895ha of land suitable to grow Vegetables would support around 5,000ha of horticulture, over a mix of permanent newly planted or restored orchards, soft fruit & vineyards and salads & vegetables grown in 5-6 year rotations with fertility building grazed leys for 2-3 years within the rotation plus possibly an arable crop or 2 thrown in on the best land.

The 38,157ha in the Arable column would support around half of that area growing cereals, oilseeds or pulse crops in any one year, affording room in the rotation for fertility building, so 12-18,000ha of annual arable crops.

That leaves, in any one year around 45-50,000ha of grassland to support the livestock & build fertility. There is also the opportunity to establish a sizable amount of woodland on some of this & an appropriate level of wilding.

With regards to the nutrients required to grow all those crops organically, the calculations for requirements are complex, with lots of variables – free range animals tend to fertilise the range as they graze while housed animals provide a spreadable source that can be targeted at the right field at the right time. Generally, Pig, Poultry & Dairy farms tend to be nutrient-rich, with surpluses available for spreading elsewhere. Sheep & Beef farms are often slightly nutrient-short, though the planned system will include more clover, pulses and other fertility building crops as part of the rotations. There is also the opportunity to bring composted domestic food waste back into circulation, growing more crops. This element of the plan needs further work – calculate likely nutrient requirements, identify shortages, highlight circular systems & recommend solutions to bring positive fertility balance & growing soil carbon levels.

Calculations in this Plan will assume from here on that there are sufficient nutrients circulating around the system, and that it will be subjected to the nutrient calculations in due course, looking for balance or better

## 6 Current Use of our Soils

In 2022, the House of Commons library published Farming & Food Statistics for the South West<sup>13</sup>, listing the South Hams area as farming:

	Total farmed	Cereals	Arable Crops (excluding cereals)	Fruits & Vegetables	Grassland
South Hams	70,476ha	12,183ha	3,604ha	410ha	49,682ha

table 4 - Current cropping in South Hams area (4,600ha unaccounted for in figures – trees/others)

### 6.1 Arable including horticulture

**Arable:** The area of non-cereal arable crops (3,604ha), will be a combination of Oilseed Rape for oil and Forage Maize, (virtually all fed to Dairy cows).

**Horticulture:** The 410ha of horticulture, declared above, is likely to be an underestimate as small horticultural plots are often not picked up by Govt statistics. Even so, an early conclusion would be that the area of horticulture is very inadequate to feed our population. The Soilscape data above, with some 57,000ha of farmland which is suitable for some level of crop production ought to afford us around 5,000ha of land suitable for fruit & vegetable production in any one year, though always as part of mixed farming systems in order to widen veg rotations and be largely self-sufficient for nutrients, provided in the form of animal manures and composted vegetable & garden waste.

## 6.2 Livestock

Currently, we have a significant number of animals here, particularly grazing animals:

	Cattle	Sheep	Pigs	Poultry
South Hams	70,566	163,177	7,230	230,892

Table 5 – Farm animal numbers in the South Hams (HoC Library, SW Food & Farming statistics 2022<sup>14</sup>)

**Cattle:** The cattle will be a combination of Dairy cows utilising some of the best land plus finishing beef & suckler beef herds using the more challenging land.

**Sheep:** The Sheep figure will include breeding stock and lambs, likely to be in the region of 60,000 ewes plus 100,000 lambs produced & slaughtered every year.

**Poultry:** The Poultry will be a combination of table birds for meat, mainly chicken but some goose & turkey, plus egg laying hens.

**Pigs:** We have no data for the pigs, but it is likely a split of around 1200 breeding sows with 6000 fattening youngsters.

Virtually none of these animals will be kept to organic conditions at the moment and most of the pigs and poultry will be kept indoors. Certified organic pigs & poultry must be free-ranging, and their feed produced & milled to organic standards. Land needs allocating for these animals to live on and for their feed to be grown.

# 7 Food and Health

The current food system is based upon a dozen major retailers selling us 90% of the food we consume at home, delivering value primarily. It employs ever more efficient logistics & distribution, processing & packaging to minimise input costs yet generally, makes an attractive & tasty product. Whether that product is healthy & wise is not the primary goal. Will it sell in the volume needed to make a margin at every stage of the chain, is the main concern. The National Food Strategy part II14 (the NFS), declared that “Our food is making us ill”, thanks largely to over-processing in factories & under-ambition at Policy level.

There is always a healthy debate as to what to do about our decreasing collective health, but the NFS takes a robust line that the answer lies in a switching to a healthier diet. The report stops short of calling for more farming with organic methods, preferring a mix of intensifying agriculture in those parts of the UK that have the best soils & infrastructure and allowing agriculture to de-intensify in the least productive areas, (which very much includes the South Hams). This de-intensification could include a switch to organic farming, keeping our farmers in the food business while delivering significant increases in biodiversity levels.

## 7.1 Changes in Diet

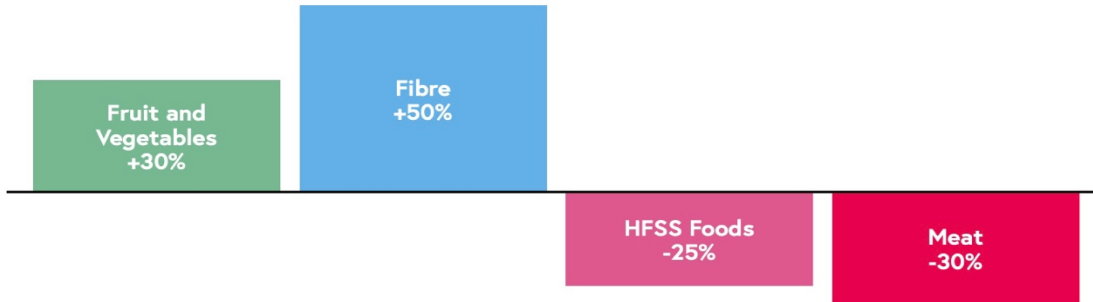
The main changes proposed in the national diet would be:

- a 30% rise in the consumption of fresh fruit & vegetables and a 50% rise in fibre, (via a combination of cereals, vegetables & pulses),
- a 30% reduction in meat & dairy, (NB, for the calculations below, we have assumed a drop of only 20% in the South Hams for Beef & Lamb while assuming a 30% fall in Poultry & Pork consumption because the latter will become relatively more expensive if outdoor, organic &

smaller scale slaughtering are used, while Beef & Lamb prices will not change as much by comparison).

- a 25% reduction in HFSS foods (foods that are High in Fat, Salt & Sugar)

**Changes are needed to the national diet by 2032 (compared to 2019) to meet health, climate and nature commitments<sup>†</sup>**



<sup>†</sup> Three of the diet-related targets are based on advice from the Scientific Advisory Committee on Nutrition. A 30% increase in fruit and vegetables would bring us in line with the Eatwell recommendation to eat five pieces of fruit and vegetables per day; a 50% increase in fibre would bring us in line with the SACN recommended 30g/day; a 25% reduction in consumption of HFSS foods will take us towards the required 60% reduction in salt, 20% reduction in saturated fat; and 50% reduction in free sugars. A 30% reduction in meat is required to achieve the fifth carbon budget and the 30x30 nature commitment – this represents the creation and maintenance of at least 410,000 hectares of woodland, maintaining and restoring 325,000 hectares of peatlands, and managing 200,000 hectares mainly for nature (for example, heathland and species-rich grassland, some of which would be managed through conservation grazing.)

**Changes to the National diet, from the National Food Strategy part II**

All these changes could be within the remit and scope of a co-ordinated local food economy, but the last recommendation of the NFS on HFSS foods, would probably require policy change at a national level to either tax sugar & salt (as the NFS recommends, for volume purchases, not at domestic levels), or legislate on recipe formulations, something that governments have been desperate to avoid doing since wartime rationing ended.

The main things a Plan such as this can do to achieve this goal is to engage residents & businesses to cook from scratch, rather than buying ready prepared products and meals and help build a diverse food industry here that takes care to make healthy and tasty food using basic ingredients, usually under organic certification.

**7.2 Changing behaviours and the economic benefits**

The calculations of what our South Hams population will need to eat are based on the recommendations above, (with a slight adjustment on Dairy, Meat, Beef & Lamb down 20%, for reasons explained above). Of course, what people should eat and what they do eat are not the same thing. For the purposes of this report, we will stick to the former. When it comes to working out an actual working food system, the starting point would be the current consumption data, reflecting the shopping & eating tastes at that time. Any plan needs to start with where people are and work from there – what food they are buying and their attitudes to changing it.

The Department for Energy Security & Net Zero (the DESNZ) runs a quarterly Attitudes Tracker [ref 15] that asks a survey cohort their opinions on (among other things) Climate Change & how they feel about it. Some conclusions were (from a combination of Summer 2022 & Winter 2023 reports), that:

- 75% of people think more needs doing to combat Climate Change (CC)
- Most people expect to pay more for things that will help mitigate CC
- People link Food Waste & Recycling with their food choices, there is no apparent link in the public mind between CC & how their food is grown & manufactured, not in this survey anyway



- Rural dwellers are less willing to spend more to buy a more 'climate friendly' product. Both surveys were conducted when fuel and food price inflation were at their heights, affecting people in rural areas more in the wallets than urban populations
- There is an 80-85% public trust in scientists & Universities, Charities are lower and Government lower still
- In the SW, 71% were either not-at-all or not-very, confident that UK Climate Change policies were going to achieve their goals, 15% were 'fairly' and only 2% 'very' confident that they would.
- When it comes to taking Action, people say it is better to see others doing it too, but many say they are doing what they can, regardless

Ultimately any Plan will have to meet the Public, be tested, improved & made to work, primarily driven by Public demand for the food. Retailers, Cooks & Farmers can provide the raw materials & finished goods and the third sector, support service providers & governments at all levels can help influence rules & provide the support that will be needed. The conclusions in the Attitudes Tracker above are a useful starting point for now – people know that more needs doing that aren't being done now, and the things that are being offered tend to require selfless acts of altruism from us as individuals whereas most people think that collective action would, a) work, and b) be easier to join in.

With regard to what is happening in the real world, away from dieticians and strategy writers, most of us buy most of our food either from or delivered by a supermarket, topping up at convenience stores. According to market data company Nimblefins in their report Average UK Household Cost of Food 2023 [ref 16], (since then, food price rise inflation has been another c.10%, so consider these figures as low), the average person in the UK spent £1973 per year on 'food at home', and £530 on food 'out of home', be that a bacon roll at the local drive-in or a take-away delivered & eaten at home.

**Average UK Food Spend, Annual and Weekly**

	Per Person	Per Household (avg 2.3 people)
<b>Weekly</b>		
Food at Home	£34	£79
Food Out (e.g., restaurants, take away, etc.)	£10	£23
<b>Total</b>	<b>£45</b>	<b>£103</b>
<b>Per Year</b>		
Food at Home	£1,793	£4,124
Food Out (e.g., restaurants, take away, etc.)	£530	£1,220
<b>Total</b>	<b>£2,323</b>	<b>£5,343</b>

It is easy to show that the 89,600 residents (2021 census) probably spent around £160m on food in shops, farmers markets, home delivery etc, and another £47m on food out of home. Using some of the Sustain data from their report, The Case for Local food [ref 6], where there is a tenfold difference in outcomes between £10 spent in a national chain on food from outside the area and £10 spent at a farm shop or farmers market buying food produced locally.

There is a marked gain for the economy which, if shared fairly, could result in the organic food becoming affordable at the same time as building carbon in the land, increasing farmland biodiversity with the population working together to make genuine strides towards net zero.

In the table below, we have used an optimistic current figure of 10% for locally produced & traded food bought for 'at home'. For 'out of home', we have gone with a 20% share – many of our caterers & eateries are based here, buying & employing locally. We have not allowed for visitors to the area in this case, but they are included in the detailed calculations further below, which are based on personal daily food intake being multiplied up to calculate the collective annual food requirements by food type,

and turn those into hectares of crops and numbers of animals – how self sufficient could we be at organic yields and stocking rates?

The table below illustrates the local multiplier effect, top section is Now (2023 spend), the lower is at 80% local. The number in green is equivalent to nearly £2,500 per person per year.

Number of citizens	Average spend	% of local food economy	Annual food spend	£ retained	£ out ( - ) of or Value to the local economy
89600	£1,793 at home	10%	£160,652,800	£76,310,080	-£84,342,720
	£530 out of home	20%	£47,488,000	£33,241,600	-£14,246,400
			<b>£208,140,800</b>	<b>£109,551,680</b>	<b>-£98,589,120</b>
	£1,793 at home	80%	£160,652,800	£329,338,240	£168,685,440
	£530 out of home	80%	£47,488,000	£97,350,400	£49,862,400
		<b>£208,140,800</b>	<b>£426,688,640</b>	<b>£218,547,840</b>	

## 8 Local Food Requirements

For this section, we have used the methodology used in a report written for Bridport Town Council [ref 17] to work out annual food requirements here in the South Hams, and have used those to assess volumes of crops needed and numbers of animals. The Bridport report uses logical assumptions and publicly available data to make the leap from a conceptual volume to sensible numbers that farmers and policy makers can understand. The starting point is their best estimate of a standard UK resident's daily dietary requirements, based on averaging 4 different sources including DEFRA & the FAO, the Food & Agriculture Organisation, see appendix 2 below.

### 8.1 Overview of Method

There are 6 steps in the calculations necessary:

1. Estimate the annual food requirements of the population in tonnes of a range of food types. This is done by considering the current consumption based on age and the demographics of the population. This is then adjusted according to the recommendations of the National Food Strategy as outlined in the previous section.
2. The tonnages are then converted into so called 'field tonnage' that takes into account the normal expected losses for each crop type.
3. Amount of food imported into the district.
4. Determine the number of animals needed to produce these amounts of food
5. Determine the amount of land required to feed and support them
6. Determine the land area to grow the human food

### 8.2 Step 1 – Annual Food Requirement

Food Tonnages									
	Current consumption (g/person/day)				Adjust	New consumption, Meat & Dairy -30%, Veg & Fruit +30%			
Age Ranges	0 - 17 Yrs	18 - 64 Yrs	65+ Yrs	Total		0 - 17 Yrs	18 - 64 Yrs	65+ Yrs	Total
<b>Number of Citizens</b>	15413	48107	25123	88643		15413	48107	25123	88643
<b>Cereals &amp; pulses</b>	346g	332g	303g	10,555t	50%	519g	498g	455g	15,832t
<b>Nuts &amp; Seeds</b>	1g	4g	3g	103t	50%	2g	6g	5g	155t
<b>Oils, Fats &amp; Spreads</b>	12g	23g	39g	829t	0%	12g	23g	39g	829t
<b>Sugar &amp; Confectionary</b>	32g	38g	30g	1,122t	-25%	24g	29g	23g	842t
<b>Beer</b>	21g	158g	136g	4,140t	0%	21g	158g	136g	4,140t
<b>Cider</b>	3g	20g	18g	533t	30%	4g	26g	23g	693t
<b>Wine</b>	1g	47g	55g	1,335t	0%	1g	47g	55g	1,335t
<b>Spirits</b>	0g	8g	3g	168t	0%	0g	8g	3g	168t
<b>Vegetables</b>	93g	168g	172g	5,050t	30%	121g	218g	224g	6,565t
<b>Potatoes &amp; tubers</b>	96g	104g	90g	3,192t	30%	125g	135g	117g	4,149t

Legumes	7g	13g	14g	396t	30%	9g	17g	18g	515t
Salad	19g	60g	65g	1,756t	30%	25g	78g	85g	2,283t
Top Fruit	34g	33g	45g	1,183t	30%	44g	43g	59g	1,538t
Soft Fruit	21g	21g	28g	744t	30%	27g	27g	36g	967t
Fruit Juice	11g	10g	4g	274t	30%	14g	13g	5g	356t
Milk	431g	263g	416g	10,857t	-20%	345g	210g	333g	8,686t
Dairy Products	45g	50g	53g	1,617t	-20%	36g	40g	42g	1,294t
Eggs & products	15g	23g	20g	672t	-20%	12g	18g	16g	537t
Fish & Fish products	26g	33g	50g	1,184t	-20%	21g	26g	40g	947t
Beef & products	40g	39g	26g	1,148t	-20%	32g	31g	21g	919t
Lamb & products	9g	8g	29g	457t	-20%	7g	6g	23g	366t
Pork, Bacon etc	37g	48g	39g	1,409t	-30%	26g	34g	27g	986t
Poultry & products	60g	78g	34g	2,019t	-30%	42g	55g	24g	1,413t

### 8.3 Step 2 – Convert to Field Tonnages

Harvest Tonnage Requirements				
	Tonnes of food	Notes on converting from edible food back to field & farm raw materials	Conversion to raw material	Harvest requirements
Cereals & pulses	15,832t	Across the category, approx 70% raw material ends up on sale. Secondary products useful from the remains	150%	23,748t
Nuts & Seeds	155t	80% yield across the category	125%	194t
Oils, Fats & Spreads	829t	Low conversion rate leaves lots of secondary products as mainly animal feed	600%	4,974t
Sugar & Confectionary	842t	Sugar unlikely to factor in plans but conversion factor is low	1200%	10,101t
Beer	4,140t	1t Barley makes 750kg Malt makes 6,000l	25%	1,035t
Cider	693t	1.7kg apples makes 1 litre of cider	170%	1,178t
Wine	1,335t	1.3kg Grapes makes 1 litre of wine	130%	1,736t
Spirits	168t	27kg Grain makes 10l = 9kg of spirit	300%	504t
Vegetables	6,565t	Assume typical 'vegetable' yields after trimming, peeling etc is 70% = 1.4x multiplier	140%	9,192t
Potatoes & tubers	4,149t	Typically 1t lifted = 800kg of product = 700g of product	140%	5,809t
Legumes	515t	1kg fresh = 600g of product after harvest & shelling	160%	824t
Salad	2,283t	1kg fresh = 750g after trim, sort, wash	135%	3,083t
Top Fruit	1,538t	1t harvested leads to 750kg ready to eat (incl cold store losses)	135%	2,077t
Soft Fruit	967t	1kg harvest = 850g to eat	120%	1,160t
Fruit Juice	356t	1t of fruit typically makes 600kg of juice	160%	570t
Milk	8,686t	1 litre produced is 1 litre consumed	100%	8,686t

<b>Dairy Products</b>	1,294t	Typically, 4kg milk = 1kg Yogurt, 10kg milk = 1kg cheese (lots of by-product for animals)	700%	9,056t
<b>Eggs &amp; products</b>	537t	1kg raw egg = 800g of liquid egg	130%	699t
<b>Fish &amp; Fish products</b>	947t	Assume 30% waste across fish and seafood	140%	1,326t
<b>Beef &amp; products</b>	919t	Assume 85% usage from trimmed carcase	120%	1,102t
<b>Lamb &amp; products</b>	366t	Assume 75% use from trimmed carcase	130%	475t
<b>Pork, Bacon etc</b>	986t	Assume 85% usage from trimmed carcase	120%	1,183t
<b>Poultry &amp; products</b>	1,413t	Assume 85% usage from trimmed carcase	120%	1,696t
	55,516t	Adjusted total requirements		90,407t
This equates to around 35,000t of 'waste' in the system, much of this can be used as secondary markets for ingredients, animal feeds and ultimately composted to return nutrients back into the system.				

## 8.4 Step 3 - Imports

Imports into the district							
Food item	12 month needs	% SH Grown	% Import	Notes	Tonnes SH Grown	Tonnes Import	
<b>Cereals &amp; pulses</b>	23,748t	100%	0%	Needs a lot of effort, storage and manure. All bakers need to be engaged. Farmers got this	23,748t	0t	
<b>Nuts &amp; Seeds</b>	194t	20%	80%	Over 10 years we might be 20% self sufficient. Needs processing plant & store. Grower training	39t	155t	
<b>Oils, Fats &amp; Spreads</b>	4,974t	80%	20%	Will take 10 years to reach this level, will take grower training, soil improvement & patience	3,979t	995t	
<b>Sugar &amp; Confectionary</b>	10,101t	10%	90%	Ingredients (fruits, colours, flavours) only, sugar is a commodity, better to get to know a sugar co-op & support them, buying sugar direct	1,010t	9,091t	
<b>Beer</b>	1,035t	80%	20%	Brewers will always want to bring new hops, malts & flavours in, we need to leave them room. We need a maltster & facilities in Devon + Universal Bottles	828t	207t	
<b>Cider</b>	1,178t	100%	0%	100% SH scrumpy is possible in 10 years	1,178t	0t	
<b>Wine</b>	1,736t	30%	70%	Needs 10 years to reach 30%. Wine is global and brings joy	521t	1,215t	
<b>Spirits</b>	504t	20%	80%	Base grains, flavours and local distillers all possible now. Need to ask the distillers what they could use & we work out how with farmers	101t	403t	
<b>Vegetables</b>	9,192t	90%	10%	Take 10 years, investment in mech, tech & training, stores, transplant raising, Freezer plant (for 30%) - crops grown to freeze, irrigation, planning. Imports through Winter & Spring Hungry gap	8,272t	919t	
<b>Potatoes &amp; tubers</b>	5,809t	90%	10%	Take 10 years, 10% imports will be New Season & Frozen. Needs 2-3 competent growers groups across the region, irrigation, Freezer plant - crops grown to freeze for chips	5,228t	581t	
<b>Legumes</b>	824t	80%	20%	Take 10 years, needs one good grower group near Freezer plant for Peas & Beans. 25%	659t	165t	

				grown in small hort units, the rest with farmers		
<b>Salad</b>	3,083t	75%	25%	Needs investment in training & staff accommodation, polytunnels & glass, irrigation, plant raising. Imports through Winter, Salad inspires hope even in the darkest days	2,312t	771t
<b>Top Fruit</b>	2,077t	80%	20%	Take 12-15 years, training, site selection, variety selection, marketing, packing site and retail co-operation. Build great cold & CA stores	1,661t	415t
<b>Soft Fruit</b>	1,160t	40%	60%	Take 10 years, needs training, worker accommodation, polytunnels, Freezer space & marketing. Our short season means over half fresh fruit will always need importing	464t	696t
<b>Fruit Juice</b>	570t	60%	40%	Take 10 years to reach output levels but we have 3 Juice plants here now, so facilities & skills are here. Universal Bottle would help	342t	228t
<b>Milk</b>	8,686t	100%	0%	Possible over time - farmers need convincing, c.3 year conversion for stock & for farmers to extricate themselves from contracts. At least 4 milk processing plants here now. Needs Universal Bottle & deposits	8,686t	0t
<b>Dairy Products</b>	9,056t	80%	20%	Some cheeses just can't be done here or anywhere than where they are made now. SH could be 80% self-sufficient, skills and small scale plants here now that could grow & plenty of milk is produced here now	7,245t	1,811t
<b>Eggs &amp; products</b>	699t	100%	0%	8-10 year project, packing & distribution needs investment, liquid egg centre for seconds & seasonal surpluses, producer training & 2-3 pullet rearing farms needed. Returnable packaging possible. 100% SH feed possible with a mill being built near grain area	699t	0t
<b>Fish &amp; Fish products</b>	1,326t	80%	20%	Possible with training, processing, freezing & storage, partnerships with Plymouth & Brixham. Marketing needs to be good plus cooking classes for our population	1,061t	265t
<b>Beef &amp; products</b>	1,102t	100%	0%	Possible with 5 years with farmer persuasion, retailer & caterer co-operation essential	1,102t	0t
<b>Lamb &amp; products</b>	475t	100%	0%	Possible with 5 years with farmer persuasion, retailer & caterer co-operation essential. Secondary products - wool & skins ripe for investment	475t	0t
<b>Pork, Bacon etc</b>	1,183t	80%	20%	80% possible. Pork is expensive to produce so essential to never have surplus. Needs investment in training, site choices, production facilities, slaughter & cutting plants (Ashburton & Buckfastleigh start)	947t	237t
<b>Poultry &amp; products</b>	1,696t	90%	10%	5-8 year project with multiple growers across the area, 2-3 slaughter sites, access to freezers & breeding farm for chick production	1,526t	170t
<b>Total</b>	<b>90,407t</b>	<b>80%</b>	<b>20%</b>		<b>72,083t</b>	<b>18,324t</b>
		80%	20%		Tonnes SH grown	

## 8.5 Step 4 – Number of Animals

Animal numbers, (target tonnages) are from the SH Grown column in the table above

The following calculates animal numbers, and the feed needed; both forage (silage) & concentrates (feed from arable).

Scenario 1 – South Hams residents only (no tourists)						
	Demand (tonnes)	Head (number of animals)	Feed (tonnes)	Silage (tonnes)	Pasture (ha)	Notes
Dairy Cows		2,896 cows	724t	6,662t	1,738ha	Production = 5,500kg/cow
Dairy Bulls		14 bulls	1t	33t	9ha	1 bull for 200 cows plus AI for breeding champions
Heifers		724 head	72t	797t	241ha	Replace 25% of the milkers every year
Calves		2,607 head	261t	2,346t	434ha	90% of cows calve every 12 months
<b>Total Dairy No</b>	<b>15,931t (target)</b>	<b>6242</b>	<b>1,058t</b>	<b>9,838t</b>	<b>2,422ha</b>	<b>“Milk” &amp; “Dairy products” combined</b>
Beef Cows		1,200 cows	0t	1,800t	720ha	
Beef Bulls		20 bulls	0t	35t	12ha	1 bull for 60 cows
Beef Heifers		240 head	0t	264t	80ha	1/6 of cows replaced every year
Beef calves		840 head	0t	1,008t	210ha	90% of cows calve every 12 months
Beef X Dairy calves	565t	1,883 head	0t	753t	941ha	ex dairy calves not needed for replacing cows, kept for 2 years as beef animals, slaughtered at 300kg net
Full Beef	336t	840 head	0t	210t	350ha	Slaughtered at 2.5 years at 400kg
Ex Dairy Cull cows	217t	724 cows	0t	1,665t	434ha	25% of dairy herd taken out annually at 300kg net
Ex Beef cull cows	60t	200 cows	0t	300t	120ha	1/6 of herd replaced annually, slaughter at 300kg net
<b>Total Beef Number</b>	<b>1,102t (target)</b>	<b>5,947 head</b>	<b>0t</b>	<b>6,036t</b>	<b>2,868ha</b>	
Breeding Ewes		17,604 ewes	176t	1,760t	2,201ha	Each ewe produced 1.4 lambs per year
Breeding Rams		440 rams	0t	110t	55ha	
Replacement Ewes		2,934 ewes	73t	587t	293ha	1/6 of ewe flock replaced annually
Meat lambs	413t	21,712 head	1,086t	0t	1,357ha	Slaughtered at 19kg net weight
Cull Yews	88t	2,934 ewes	29t	293t	367ha	Slaughtered at 30kg net weight, combination of breeds
<b>Total Sheep Number</b>	<b>475t (target)</b>	<b>42,690 head</b>	<b>1,335t</b>	<b>2,457t</b>	<b>3,906ha</b>	
Breeding Sows		748 sows	823t	0t	62ha	1 sow produces 23 fattening pigs per year
Breeding Boars		75 boars	82t	0t	6ha	1 boar for 10 sows
Replacement Sows		224 sows	67t	0t	9ha	30% of sows replaced annually
Finished Pigs	947t	17,211 head	2,582t	0t	229ha	Finished pigs slaughtered at 55kg net

<b>Total Pig Numbers</b>	<b>947t (target)</b>	<b>18,258 head</b>	<b>3,554t</b>	<b>0t</b>	<b>307ha</b>	
<b>Table Meat Birds</b>	1,526t (target)	635962	6,996t	0t	32ha	2.4kg of meat per bird, feed = 11kg feed (plus pasture value) total each, stocking at 20,000/ha
<b>Egg Chickens</b>	699t (target)	48508	2,183t	0t	24ha	Each bird lays 240 eggs per year at 60g = 14.4kg per bird, 45kg feed/year
<b>Replacement pullets</b>		29105	175t	0t	7ha	Replace 60% of laying hens every year, buy 1 day old chicks, 4 weeks with heat, eating chick crumb then grower's feed then 13 weeks rearing, Chicks eat 1.5kg crumb, pullets eat 6kg growers ration
<b>Chicks</b>		29105	44t	0t		
<b>Total Poultry</b>		<b>742679</b>	<b>9,397t</b>	<b>0t</b>	<b>63ha</b>	
			15,344t	18,331t	9,567ha	Plus 509ha for the 18,331t of forage at 36t/ha = <b>10,076ha</b> total

The 10,076ha of pasture (at the end of the above table) is land for cutting, grazing & scratching. The calculations for land area of arable for Feed and grassland for Forage are on table 12 below, along with calculations for human food crops.

The requirements for animals here to feed the population at 80% of its needs is markedly different to the current situation, shown in the table above:

	<b>Cattle</b>	<b>Sheep</b>	<b>Pigs</b>	<b>Poultry</b>
<b>Scenario 1</b>	12,189 head	42,690 head	18,258 head	742,679 birds
<b>Current situation</b>	70,566 head	163,177 head	7,230 head	230,892 birds

It appears clear that the transition to a local food economy would entail a dramatic rise in the number of pigs here along with a similar scale rise in poultry numbers. Given that we do not know how many of the current poultry number are meat or egg producing birds, it is hard at this stage to comment further on what needs to happen there.

The other conclusion is that from a self-sufficiency perspective, we are awash with cattle and sheep. The same caveat applies to the cattle numbers as to the poultry – we do not know the split between head of dairy cattle and beef. As we look at the other 3 scenarios later, it may become apparent that the abundance of bovines and ovines gets much reduced.

## 8.6 Steps 5 & 6 – Land to feed animals and humans

The following calculate the land area for animals & to grow crops for human foods.

<b>Land for Feed and Horticulture</b>				
<b>Farm type</b>	<b>Main Customer</b>	<b>Vol needed</b>	<b>Yield / ha</b>	<b>Area needed</b>
<b>Arable</b>	Dairy concentrate feed	1,058t	4.2t	252ha
	Beef concentrate feed	0t	4.2t	0ha
	Sheep concentrate feed	1,335t	4.2t	318ha
	Pig concentrate feed	3,554t	4.2t	846ha
	Poultry concentrate feed	9,397t	4.2t	2,237ha
	Total for feeding animals	15,344t		<b>3,653ha</b>
	<b>Cereals &amp; pulses</b>	23,748t	4t	5,937ha
	<b>Oilseeds</b>	3,979t	3.6t	1,105ha
	<b>Beer - barley, rye, wheat etc</b>	828t	4.2t	197ha
	<b>Spirits - barley, wheat</b>	101t	4.2t	24ha
	<b>Total arable for citizens</b>	28,656t		<b>7,263ha</b>
	Total arable	44,000t		10,917ha



<b>Pasture &amp; forage</b>	Grazing for Beef & Dairy			5,290ha
	Forage for Beef & Dairy	15,873t	36t	441ha
	Grazing for Sheep			3,906ha
	Forage for Sheep	2,457t	4.2t	62ha
	Land for Pigs			307ha
	Land for Poultry			63ha
	<b>Total grazing, forage &amp; scratching / rooting</b>			<b>10,070ha</b>
<b>Horticulture</b>	<b>Vegetables</b>	8,272t	16t	517ha
	<b>Potatoes &amp; Tubers</b>	5,228t	25t	209ha
	<b>Legumes</b>	659t	8t	82ha
	<b>Salad (25% polytunnels)</b>	2,312t	18t	128ha
	<b>Total annual horticulture</b>			<b>937ha</b>
<b>Orchards</b>	<b>Nuts etc</b>	39t	3t	13ha
	<b>Cider</b>	1,178t	11t	107ha
	<b>Top Fruit - apples, plums etc</b>	1,661t	11t	151ha
	<b>Fruit Juice</b>	342t	11t	31ha
	<b>Total orchard area</b>			<b>302ha</b>
<b>Soft Fruit</b>	<b>Confectionary, flavours etc</b>	1,010t	5t	202ha
	<b>Wine - vineyards</b>	521t	7t	74ha
	<b>Soft Fruit - raspberries, currants etc (30% polytunnels)</b>	464t	8t	58ha
	<b>Total soft fruit</b>			<b>334ha</b>
	<b>Total Horticulture - vines, tunnels, fields, orchards</b>			<b>1,574ha</b>
	<b>Total Farmed Area</b>			<b>22,560ha</b>

In terms of our farmland and its capacity to feed our 88,600 residents, it looks like there is more than enough here to feed us all at organic yields up to 80% of our needs. Whilst that's reassuring, it is of little comfort without confronting the serious imbalances in the types of enterprises (and skills sets, ambitions, machinery, infrastructure etc too), that we would need to adapt to considering our current land and cropping choices.

## 8.7 Analysis Outcomes

In terms of our farmland and its capacity to feed our 88,600 residents, it looks like there is more than enough here to feed us all at organic yields up to 80% of our needs. Whilst that's reassuring, it is of little comfort without confronting the serious imbalances in the types of enterprises (and skills sets, ambitions, machinery, infrastructure etc too), that we would need to adapt to considering our current land and cropping choices.

	<b>Grassland</b>	<b>Arable</b>	<b>Horticulture</b>	<b>Total</b>
<b>Scenario 1</b>	10,070ha	10,917ha	1,574ha	22,560ha
<b>Current situation</b>	49,682ha	15,787ha	410ha	65,879ha

The current food system has driven our area & its farmers to play to their strengths while allowing other parts of the country to play to theirs – our rainfall & natural ability to grow great grass has led to 75% of our land being under grass, and less than 1% in horticulture.

The Fruit & Vegetables eaten here are mostly being grown somewhere else where the land, skills and infrastructure can deliver fresh & frozen produce more efficiently to the supermarket system than our own land & farmers can.

In the calculations above, we could have a rolling 5,000ha of horticulture here (a combination of permanent polytunnels, orchards & vineyards plus field vegetables grown within grass/arable rotations), 12-18,000ha of arable and 45-50,000ha of grassland (and probably a significant area of new woodlands & wild areas).

The figures in the table above would suggest that we have sufficient land to feed ourselves, subject as already stated, to an assessment of likely nutrient mass balance – how many animals & how much composted food waste would we need to supply the organic farms here?

## 9 Feeding Neighbours and Tourists

So far we have only considered the indigenous population of the district and based on the calculations made in the previous section the district would be able to feed itself. However, as a tourist area with neighbouring urban areas the question arises about meeting their demands as well.

Four scenarios are considered:

1. No tourists or visitors.
2. Providing for tourists and visitors
3. Providing for some of the population of Torbay and Plymouth
4. Providing for the tourists to Torbay and Plymouth

**Scenario 1:** It is evident from the calculations above that it would be possible to feed the indigenous population of the district.

**Scenario 2:** The Visit Britain website has a breakdown of overnight trips by local authority [ref 18] which suggests that there was an annual average of 2,878,000 in the 2017-19 period. This is the most accurate figure available. This equates to the equivalent of 7,885 extra residents and since we don't know the age breakdown, we have done the calculations based on all visitors being adults between 18 & 64 years.

**Scenario 3:** To determine what would be a fair share of Plymouth & Torbay residents who could look to the South Hams for 80% of their food needs, a very broad brush is needed. There is no direct data to draw on so this can only be roughly estimated.

### 9.1 Supporting Plymouth and Torbay

**Plymouth:** It would be fair to say that the lion's share, say 50% (of the 80% self-sufficiency level used above), would be supplied from Cornwall since that County has a long established large horticultural base in the far West. And on Plymouth's doorstep, the Southeast Cornwall area & Tamar valley are naturally fertile for arable, horticulture and animals. West Devon District Council area, with its lush green fields and the Eastern flank of the Tamar & Bere peninsula should be good for 20% of the City's needs, leaving 30% for the South Hams area to cover. Statistics for Plymouth can be split by age groups to fit our templates, 30% of 264,730 residents (2021 census) looks like:

	Age 0-17	Age 18 - 64	Age 65 +	Total
Plymouth x 30%	16149	42356	20914	79419

**Torbay:** The SHDC parishes of Marldon, Berry Pomeroy, Stoke Gabriel & Kingswear surround Paignton & Brixham and would naturally be the food basket for those towns. Torbay as a whole would need to look to the Teignbridge District Council area, for the lion's share of its food. As a start, we have set the SHDC contribution at 30% of Torbay's 148,540 residents:

	Age 0-17	Age 18 - 64	Age 65 +	Total
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Torbay x 30%	7863	24101	12598	44562
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**Teignbridge:** There is a small addition to these numbers too, the assumptions above included serving the Teignbridge towns of Buckfastleigh & Ashburton plus 2 or 3 surrounding parishes from a distribution hub near Buckfastleigh. They would all be able to provide some of their own food needs but a number needs noting. The residents there add up to around 5,500 people so we will include 5% of Teignbridge's 110,000 residents:

	Age 0-17	Age 18 - 64	Age 65 +	Total
Teignbridge x 5%	1153	2689	1647	5489

For scenario 3, this makes a total that is bigger than our own population + tourists:

	Age 0-17	Age 18 - 64	Age 65 +	Total
<b>Plymouth, 30% of residents</b>	16149	42356	20914	79419
<b>Teignbridge, 5% of residents</b>	1153	2689	1647	5489
<b>Torbay, 30% of residents</b>	7863	24101	12598	44562
	<b>25165</b>	<b>69146</b>	<b>35159</b>	<b>129470</b>

For scenario 4 – how many tourists visit Plymouth, Torbay & Teignbridge every year? Using the same source, the Visit Britain website [ref 18], and adjusting gross overnight visitors using the same percentages we calculate another 1.5m days' worth of food need factoring in, equivalent to another 4120 residents all year round:

Area	Annual visitors	% supply from SHDC	Number for SHDC	x365 nights
<b>Plymouth</b>	1690000	30%	507000	1389
<b>Teignbridge</b>	1767000	5%	88350	242
<b>Torbay</b>	3028000	30%	908400	2489
				<b>4120</b>

When we do the calculations on all 4 scenarios, we see that at organic yields, we would need a 10-fold uplift in horticulture, likely to take 10 years to achieve, with a huge amount of effort that would start soon, convert land, planting orchards & fields of soft fruit. Arable area is 10,000ha above capability.

	Current Situation	Scenario #1	Scenario #2	Scenario #3	Scenario #4	Total	Comments
<b>Arable area</b>	15,787ha	10,917ha	1,011ha	15,919ha	528ha	28,375ha	To do all 4 scenarios means double our arable area - this is too big a commitment
<b>Pasture &amp; Forage</b>	49,682ha	10,070ha	2,157ha	13,889ha	1,887ha	28,004ha	Total is a little over half of current grass area
<b>Horticulture</b>	410ha	1,574ha	150ha	2,279ha	78ha	4,081ha	10-fold uplift needed to do all
<b>Area</b>	65,879ha	22,560ha	3,318ha	32,088ha	2,494ha	60,460ha	

With regard to animals, there is again a huge uplift in pigs and poultry, 7 & 8-fold increases. Again, a major pivot & set of investments needed. Even at these levels however, the South Hams would still be a net exporter of dairy products, beef and lamb.

	Current Situation	Scenario #1	Scenario #2	Scenario #3	Scenario #4	Total	Comments
<b>Cattle</b>	70,566 head	12,189 head	4,032 head	16,282 head	3,703 head	36,206 head	Approx half of current herd will suffice
<b>Sheep</b>	163,177 head	42,690 head	2,142 head	61,344 head	1,124 head	107,300 head	would still be a net exporter of lamb
<b>Pigs</b>	7,230 head	18,258 head	1,784 head	26,595 head	936 head	47,573 head	Massive uplift, 800ha of the right land needed
<b>Poultry</b>	230,892 birds	742,679 birds	80,922 birds	1,086,051 birds	42,444 birds	1,952,096 birds	8x uplift would be required

## 10 Opportunities and Challenges

It would be fair to say that the South Hams area does indeed have the right amount of land to feed itself and its visitors in a sustainable style, ie farming to organic standards as first choice. A lot would need to change and a lot would need to be invested, not least in persuading our citizens and visitors to adapt to a more seasonal & probably more expensive diet, at least at first, for the betterment of their own health, reversing biodiversity declines, reducing food miles and positive retention of money spent on food in our region.

An engaged public will be an asset. The research above, following public attitudes, points towards an expectation by the public that there will be changes they will have to adjust to, possibly with extra costs, and of the need for a coherent plan from government.

Our farmers will only pivot to the market on their doorsteps if they see it will bring long term gains for their businesses. Seeing genuine demand and fair routes to this new market will be the way-markers to help make these once-in-a-generation farm business decisions.

If a plan such as this were to go ahead, then marketing & communications plans would need to be built in, with feedback loops set up using clever IT to link consumer mood to producer plans and report changes in soil health & biodiversity back to the food buyers in order to link buying the right food to positive outcomes.

With regard to targets, which one should we work with here? Looking at the animal & land needs to cover feeding ourselves, our visitors and significant parts of Plymouth & Torbay's populations there would come a point of overextending ourselves, risking nutrient imbalances, crop yields and public confidence. Plus, it has to be said, there is no precedent for taking on such a task, beyond doing some early maths to consider how far the South Hams food basket could extend. For now, it seems fair to set the controls to 80% self-sufficiency for our own citizens and visitors (scenarios 1 + 2), which requires about 40% of our 67,000ha of farmland, (but it will be the best 40%).

# 11 Land Use Changes

The following table outlines the land use changes

Changes needed to areas and animal numbers						
	Current Situation	Scenario #1	Scenario #2	Total	Change	Comments
<b>Arable area</b>	15,787ha	10,917ha	1,011ha	11,928ha	-3,859ha	A switch to organic methods & a wider range of grains and pulses. Existing infrastructure copes with harvest and storage of crops, would need investment in flour and animal feed mills. Crops to feed pigs and meat & egg layers will cover 929ha & 2479ha respectively (nearly 30% of all arable)
<b>Pasture &amp; Forage</b>	49,682ha	10,070ha	2,157ha	12,227ha	-37,455ha	Would occupy around 1/3 of existing grasslands, but likely to be the best of that land, near settlements and horticultures areas. Outdoor pigs and poultry will occupy 340ha & 70ha respectively
<b>Horticulture</b>	410ha	1,574ha	150ha	1,723ha	+1,313ha	A quadrupling in the area would be needed over time, to include poly tunnels and glasshouses and lots of infrastructure to support the industry.
<b>Area</b>	65,879ha	22,560ha	3,318ha	25,878ha	-40,001ha	Nearly 40% of current farmland would be occupied
<b>Cattle</b>	70,566 head	12,189 head	4,032 head	16,221 head	-54,345 head	This plan would still leave us as net exporters of beef & dairy products though overall numbers will fall, likely we would see overall herd at 50,000, but more sustainably managed and with improved welfare & farm profitability per cow.
<b>Sheep</b>	163,177 head	42,690 head	2,142 head	44,832 head	-118,345 head	Expect a fall in overall numbers of sheep, but a long term surplus above our own needs.
<b>Pigs</b>	7,230 head	18,258 head	1,784 head	20,042 head	+12,812 head	A x3 increase would be needed, with pigs kept in small numbers across the region as part of mixed units, and a few breeding & growing units supplying the hubs & food service sector
<b>Poultry</b>	230,892 birds	742,679 birds	80,922 birds	823,601 birds	+592,709 birds	A rise of nearly 4-fold, to 823,000 birds. Approx 10% would be laying hens (and pullet rearing), meaning 80,000 birds, likely 20ish small flocks at 250 birds & 12 farms at 5,000 laying hens. Meat bird farms likely one near each hub, fed by local arable fields.

A project such as this would be the first attempt in the UK to change the food system while the old one is still running. At the moment, even though the South Hams proudly punches above its weight in terms of having an established localised food market, locally traded food is a tiny minority of the total spend. For it to become the only choice for 4/5ths of our dietary needs would require a huge leap of faith by the public across all classes, incomes and generations.

The Food & Agriculture Organisation of the United Nations, (the FAO), has done significant research on transforming Food Systems [ref 19] around the World, and they have a few golden rules to consider at the outset:

- *Agrifood systems transformation can accelerate multiple agendas.* Leveraging the agrifood systems agenda means realizing that it is important and urgent to team up and coordinate efforts across sectors, so that this transformation becomes an accelerator of existing multiple agendas.
- *Shared clarity and trust start by bringing people together.* Communication, open dialogue, and informative data serve as a basis to recognize a common problem, increase clarity, and mobilize stakeholders around addressing that specific problem.
- *Start from what is already available.* To achieve good governance, avoid red tape as much as possible. Experience from countries shows that creating new bodies is time-consuming and can delay taking concrete action to bring about change. Rather, steering committees should work within the existing ecosystem and structures that are already in place. Funding for transformation is also key and partnering with bodies whose strategies are already funded can be a useful strategy.
- *Know where the boundaries are.* A formal strategic framework that sets out the objectives, a calendar, a funding plan, and financing mechanisms must be in place and agreed upon by the various stakeholders. It is also important to clearly define the responsibilities for implementation.
- *Time and dedication need to be factored in.* Transformation is a process that must be built up over time, and it must be well organised. It also takes a specific set of professional competencies...to be effective, a governance committee might need a lean and agile core group of skilled full-time staff.
- *Transformation must be inclusive and participatory.* There is a recognition that transforming agrifood systems requires engaging a diversity of voices. However, challenges remain as to how to meaningfully engage some key, but less powerful players in governance and decision-making: this is often the case for small-scale farmers, small private businesses, consumers, and youth. Consider using alternative communication channels, (e.g. radio programmes, social media) to bridge these gaps.
- *De-risking the transformation for stakeholders on the ground.* A clear call to action was made on the need for multi-stakeholder mechanisms to accompany stakeholders on the ground on a balanced pathway to transformation – for example, by enabling farmers and consumers to adopt more environmentally sustainable practices without compromising their livelihoods and household finances.

## 12 Costs and Benefits

How can such a project be assessed in the round, costs against benefits with a positive mass balance outcome, in order to decide to take any further steps? More work is needed on costs and outcomes, especially in the case of funding for supporting producers with their costs and / or citizens to afford the local organic option when it is available, and how to distribute the wealth retained when money is spent several times locally. Below is an attempt at including the biggest elements in the Cost / Benefit analysis across Social & Community, Environmental and Economic backdrops. Accepting the first point in the list above - Agrifood transformation can lever change across multiple agendas, we would expect funding from other areas of government, local & national, would be needed to bolster the most likely initial contribution from Climate Change & Biodiversity budgets:

Social & Community	
Costs	Benefits
<ul style="list-style-type: none"> <li>• Time spent engaging communities before starting &amp; during making systemic changes</li> <li>• Risk of people feeling left behind by the extra expense or change of diet</li> <li>• Risk of division with a Plan that places producing animals for meat, egg and dairy foods</li> <li>• Extra need at community health level is to be expected if unprepared people are expected to adjust to major change without support</li> <li>• Some changes in jobs are to be expected as businesses adjust, help with transitioning will be needed</li> <li>• Risk of food shortages if production fails somewhere across the system, needs factoring in</li> <li>• Risk of the area becoming less welcoming and less diverse, even if in appearance to others</li> </ul>	<ul style="list-style-type: none"> <li>• Opportunity to unite communities over food, gardens, kitchens, festivals, new-seasons etc</li> <li>• Collective belief in a plan to tackle climate change, public health crises, biodiversity loss &amp; reduce the rural / urban economic imbalance</li> <li>• Deliver SHDC Climate Change &amp; Biodiversity Strategy targets</li> <li>• More 'green jobs' in rural areas</li> <li>• Sharing economic wealth more equitably, retaining more of the tourist spend here, building resilience &amp; prosperity</li> <li>• Build confidence in a stable, sustainable food supply</li> <li>• Enhance the South Devon Brand – Green, Healthy, Tasty, Assertive, Forward Thinking</li> </ul>

Environmental	
Costs	Benefits
<ul style="list-style-type: none"> <li>• Animals will still be an intrinsic part of our food system, and more will be visible. Their ability to convert our #1 crop into useful protein, and their intrinsic link to this place, mean animals on mixed farms will forever be part of our landscape</li> <li>• The changes will take time for balances across soil, air and the rivers to settle. Moments of insect or disease pressure that challenge the system are inevitable and need planning for</li> <li>• There is likely to be more local traffic around hubs and some farms, and more of the public accessing the countryside</li> <li>• To create demand that drives future supply, the system needs to pull in produce from outside the area to encourage our farmers to convert land &amp; their businesses for 2-3 years later. There is a danger this could convey a muddled buying policy – buying in to grow more here needs to make sense with everyone here</li> </ul>	<ul style="list-style-type: none"> <li>• 25,000ha converts to organic standards, with a 50% rise in biodiversity and a rebuild of soil organic matter (SOM), which is 30% carbon</li> <li>• A 2% rise in SOM across 25,000ha to 50cm depth, over 20 years would be equivalent to 5 years emissions for every SHDC resident over that time (see note below)</li> <li>• Opportunities arise to install circular use of packaging, waste and input materials</li> <li>• Freezing of planned crops &amp; short term gluts offers extended seasons &amp; reduced food waste</li> <li>• Transport of farm products to market (mostly out of the County) is saved as is the transport of food to the South Hams area from out of the County &amp; Country±</li> <li>• Opportunities to plant many more trees across our landscape as woodland and as silvo-pasture, where trees, animals and crops can occupy the same soil</li> </ul>

Note on benefit calculation: 25,000ha x 10,000m<sup>2</sup> = 250,000,000m<sup>2</sup>. Top 50cm = 125,000,000m<sup>3</sup>. Average 1.00m<sup>3</sup> of soil = 1.40t. Therefore, 125,000,000m<sup>3</sup> of soil weighs 175,000,000t. A 2% rise in SOM by weight = 175mt x 0.02 = 3,500,000t, 30% of SOM is Carbon = 1,050,000t of Carbon. Estimated GHG emissions in SHDC area20 were 707,120t of CO<sub>2</sub>e, (8.0t per person for 88,600 residents). As 1.00t of CO<sub>2</sub>e = 0.27t of C, South Hams annual emissions can be expressed as 190,922t of Carbon annually. Take the 1,050,000t of Carbon added to the 25,000ha of soil over 20 years, is a 25% reduction to our net emissions, (5.5 years emissions out of 20 years offset).

± At 80% self-sufficient for food, it is safe to assume that most of the remaining 20% would be imported to the UK

Economic	
Costs	Benefits
<ul style="list-style-type: none"> <li>• Cost of supporting consumers with affordability</li> <li>• Investment in the Plan</li> </ul>	<ul style="list-style-type: none"> <li>• Saving of farm inputs</li> <li>• Value of being a flagship Pilot project</li> </ul>



<ul style="list-style-type: none"> <li>• Investment in skills</li> <li>• Investment in farm tech &amp; machinery</li> <li>• Investment in IT</li> <li>• Investment in infrastructure</li> <li>• Investment in circular packaging &amp; waste</li> <li>• Cost of opting out of cheaper imports</li> <li>• More expensive food for visitors</li> <li>• Creation of Innovation &amp; Learning centre(s)</li> <li>• Ongoing costs of monitoring &amp; reporting main KPIs - % homegrown vs imports, soil health index, biodiversity levels, citizen engagement etc</li> </ul>	<ul style="list-style-type: none"> <li>• Long term prosperity from fairly sharing a rising level of income across the community</li> <li>• Rising value of community &amp; co-operatively owned businesses</li> <li>• Value of the food market to the local economy goes from -£99m to £219m annually at today's prices (a positive change of £318m, £3,500/person)</li> <li>• Long term stability for our farmers &amp; food businesses</li> </ul>
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# 13 Conclusions

## 13.1 General Conclusions

1. A shift to localise regenerative Food & Farming, to organic standards as default, can help SHDC meet its net zero targets
2. Changes in the Agrifood system can accelerate multiple agendas, including that of Food Security, an issue which is fast-moving up the national political agenda from having been a non-issue for 50 years
3. The SHDC Climate Change & Biodiversity Strategy sections on Food & Farming can be updated with bold plans to deliver significant contributions to the Authority's Net Zero targets
4. Driving demand for the right food will be the main driver for change across farms, food and retail businesses
5. Engaging citizens across generations, income groups and our geography will lead to insight, engagement and increase the likelihood of success
6. Nationally, the public know that more needs doing to tackle Climate Change that aren't being done now, and the things that are being offered tend to require selfless acts of altruism from us as individuals, whereas most people think that collective action would, a) work, and b) be easier to join in
7. The South Hams farmland soils total around 67,000ha and feature a mix of 9 soil types, known as soilscape. Over 80% of the land falls into the 'Useful' bracket, though the 'Most Useful' are all out of our area:
  1. #8 - Slightly acid loamy & clayey soils with impeded drainage – useful soil spread across the entire SH area, (apart from the Moor). With sympathetic management these **35,000ha** are suitable for grazing animals, arable & horticulture, always with an eye on the likelihood of periods of waterlogging and wide rotations with annual horticulture.
  2. #15 - Loamy soils with naturally high groundwater – nice usable soil, deep enough to grow root crops and support arable & grazing animals. These soils are more localised, with **8,610ha** spread across 4 main areas – the largest is in the centre of our area, above the Modbury – Loddiswell – Moreleigh line. A nice chunk lies to the West & South Of Totnes along with an area near Ivybridge with more below the SW Moor line. There are also a few hundred hectares near Stokenham. So useful soils, usefully shared around.
  3. #3 - Freely draining acid loamy soils over rock – useful soils, some of the **6,800ha** will be fit for scratching and snuffling animals, ie poultry & pigs, of which we would need a lot more. Also suitable for the arable crops that they would live on and overwintering grazing animals outdoors. These soils are spread predominantly in the Northern half of the area in the lower flanks of the moor but there are significant blocks of it on the Noss / Holbeton peninsula and in East Allington & Blackawton parishes.
  4. #7 - Freely draining slightly acid but base rich soils – **5,740ha** of useful, light and notably, Carbon hungry soils. Laid in a broad seam from Plymouth to Paignton via Totnes and on the Soar & Prawle peninsulas. Suitable (with a keen eye on Nitrogen limits), for poultry, pigs and grazing animals as well as horticulture and arable.
  5. The remaining **11,000ha** is a combination of moorland peats & reclaimed quarry spoils. The latter needs investigating for how it can be improved and at least some of the former is likely to become part of a rewetting, re-forestation & re-peating project
8. In summary, the would support around **5,000ha** of horticulture, over a mix of permanent newly planted or restored orchards, soft fruit & vineyards and salads & vegetables grown in 5-6 year rotations with fertility building grazed leys for 2-3 years within the rotation plus possibly an arable crop or 2 thrown in on the best land. **12-18,000ha** of annual arable crops. That leaves, in any one year around **45,000ha** of grassland to support the livestock & build fertility. There is also the opportunity to establish a sizable amount of woodland on some of this & an appropriate level of wilding.
9. This compares to around **410ha** of horticulture recorded currently, **15,800ha** of arable crops and **49,000ha** of grassland.
10. With regard to how much food is needed to be 'self sufficient' the report concludes that an **80%** target would be a reasonable compromise that would still take 2 decades and the full

engagement of our food producers, policy makers and citizens. Major conclusions were that the project should start by acknowledging that a wider move to localised food economies would need to build in feeding urban areas from the surrounding farmland, with Plymouth and Torbay, (30% of their citizens in both), representing a major challenge to the South Hams area. It would take all of the 5,000ha of horticulture and twice our arable output to provide for the needs of the citizens & visitors and the pigs & poultry we would need to keep.

11. The South Hams area could though, **feed its own population with 80% of its food needs** using organic farming as the default standard. This would require around 40% of our farmland, likely to be the best 40%, totalling around 26,000ha.
12. To do so would mean major change across the farming scene, with a 4-fold increase in horticulture, from 410ha to over 1,600ha, including planting orchards & vineyards. Most of the those need planting soon, with 5-10 year lead times to full yield.
13. Current arable area would suffice to feed the human and animal populations.
14. Our current grassland area supports around 70,000 cattle – beef & dairy, and 163,000 sheep. Our plan expects demand to fall by 20% from current levels in line with the Eatwell Diet. Our figures show around **4,000** dairy cows + **3,000** followers and **8,000** beef cows + **15,000** calves & fattening, (**30,000** total) so there is still likely to be a significant surplus of dairy and beef if those farmers stick with keeping cattle. The same is likely with sheep numbers, our needs here are around **45,000** head, so  $\frac{1}{4}$  of the current SHDC flock.
15. Pigs and poultry numbers will be the biggest adjustment we need to make with our animal farming. That includes setting up pig breeding farms, rearing & growing, feed mills, additional slaughter capacity and cutting plant(s). Current number of **7,000** will need to rise to **20,000** sows and fatteners. Outdoor pigs need careful siting with a suitable soil type, great husbandry and safe navigation below environmental limits. The same is equally true for poultry, where we currently have **230,000** split between egg layers and meat birds. Numbers need to rise to nearly **750,000** birds – **80,000** layers and around **150,000** growing meat birds here at any one time. Under organic systems, all these animals will enjoy lower stocking rates, longer lives & higher levels of welfare than our current food system affords.
16. No work has been done to calculate the likely nutrients that these animals would provide, or the crop nutritional needs, to see if there is at least balance. This work needs doing as the use of animals in mixed farming systems is at the heart of this Plan.
17. To be truly successful in its aims, our area-wide food economy will be set across a series of local versions, centred on our biggest towns, with their own supply bases and likely some degree of specialisation, based on land suitability and current infrastructure, (the report recommends for instance, that a Buckfastleigh hub would specialise in meat & animal products, with a working abattoir, cutting plant, skilled workforce and easy access to the A38).
18. An ambitious project like this carries many costs and potential risks, one of the biggest of which is potential splits within the populace, not everyone will like all of it – we will still be farming animals, we prefer organic over ‘farming with science’ (as the chemical industry likes to describe its systems), it could be too middle-class - expensive & seasonal food preferred over affordable & processed etc etc. This needs considering from the start, building in citizen engagement that conveys the benefits and listens to the citizens and visitors.
19. These benefits include:
  1. environmental gains in biodiversity on the converted fields, carbon being buried and a visible change in the landscape within a few years, a significant portion of everyone's carbon footprint could be offset by rising organic matter levels in our soils. Add to this the opportunities to create circular systems for packaging to be re-used, and food waste to be composted to grow more food later.
  2. economic gains from creating local food economies. The report calculates that the area could be over £200m better off every year than it is now, because the more of our money we spend on locally produced food, the more money stays to be spent again by someone else in the area. The current food system offers the opposite, it is estimated that 75% of our current food spend leaves the area without touching the sides.
  3. society & communities gain when the financial gains are shared fairly across geography and the generations. This plan will result in more food & farming jobs in rural areas and our main towns where distribution will be centred.
20. There will need to be significant investment in order to make this happen, from the planning stage to delivery, people need consulting, infrastructure needs putting in place, crops need planting and new routes to market will need to be developed. All of this work is still to be done.

This report has been intended to look at how much food our population will need to eat and whether our farmland could support that amount and mix. The conclusion is that it could, under the most sustainable farming systems.

## 13.2 Policy Recommendations

1. Update the SHDC CC & Biodiversity Strategy doc to include Food, locality & Organic farming as the first choice for 'sustainable' or 'regenerative' food production
2. Explore with others, what regulatory & policy tools are available to SHDC & how to use them for good
3. Explore collective opportunities to raise revenue from offsetting carbon in soil
4. Calculate nutrient needs across our farmland for the crops in this plan
5. Calculate likely available nutrient supply from the number of animals in this plan
6. Identify nutrient deficits, circulation systems & recommend how to balance if necessary
7. Develop a SHDC Land Use Strategy to feed info to DCP & inform others – allow for Winter rainwater storage, wildlife corridors, encourage horticulture near towns, peat restoration, effective hedgerow management, renewable energy & tree planting
8. Assess Hub locations & map, number of people in each area, number in neighbouring areas (Plymouth & Torbay)
9. Estimate food needs for each hub
- 10. Dartington as the first hub**
11. Join Sustain UK's 'Good Food Local'21 which calls for the creation of a Local Food Investment Fund to provide strategic support for sustainable local food systems; a growth plan to deliver a 10% retail market share for non-multiples by 2030; and that every local authority area in the UK is served by a food partnership by 2025

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## Appendix A – Soilscape Coding

**Note:** Those marked with an asterisk are present in the South Hams.

- \* 1  Blanket bog peat soils
- 2  Fen peat soils
- \* 3  Freely draining acid loamy soils over rock
- 4  Freely draining floodplain soils
- 5  Freely draining lime-rich loamy soils
- 6  Freely draining sandy Breckland soils
- \* 7  Freely draining slightly acid but base-rich soils
- \* 8  Freely draining slightly acid loamy soils
- 9  Freely draining slightly acid sandy soils
- 10  Freely draining very acid sandy and loamy soils
- 11  Lime-rich loamy and clayey soils with impeded drainage
- 12  Loamy and clayey floodplain soils with naturally high groundwater
- 13  Loamy and clayey soils of coastal flats with naturally high groundwater
- 14  Loamy and sandy soils with naturally high groundwater and a peaty surface
- \* 15  Loamy soils with naturally high groundwater
- 16  Naturally wet very acid sandy and loamy soils
- 17  Raised bog peat soils
- \* 18  Restored soils mostly from quarry and opencast spoil
- 19  Saltmarsh soils
- 20  Sand dune soils
- 21  Shallow lime-rich soils over chalk or limestone
- 22  Shallow very acid peaty soils over rock
- 23  Slightly acid loamy and clayey soils with impeded drainage
- \* 24  Slowly permeable seasonally wet acid loamy and clayey soils
- 25  Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils
- \* 26  Slowly permeable wet very acid upland soils with a peaty surface
- \* 27  Very acid loamy upland soils with a wet peaty surface
- \* 28 
- \* 29  water

## Appendix B – Agriculture Land Classification

### **Grade 1** - excellent quality agricultural land (0% in South Hams)

Land with no or very minor limitations to agricultural use. A very wide range of agricultural & horticultural crops can be grown and commonly includes top fruit, soft fruit, salad crops and winter harvested vegetables. Yields are high and less variable than on land of lower quality.

### **Grade 2** - very good quality agricultural land (8% of our land)

Land with minor limitations which affect crop yield, cultivations or harvesting. A wide range of agricultural and horticultural crops can usually be grown, but on some land in the grade there may be reduced flexibility due to difficulties with the production of the more demanding crops such as winter harvested vegetables and arable root crops.

### **Grade 3** - good to moderate quality agricultural land (52%)

Land with moderate limitations which affect the choice of crops, timing and type of cultivation, harvesting or the level of yield. Where more demanding crops are grown yields are generally lower or more variable than on land in Grades 1 and 2.

#### **Subgrade 3a** - good quality agricultural land (probably half of our Grade 3)

Land capable of consistently producing moderate to high yields of a narrow range of arable crops, especially cereals, or moderate yields of a wide range of crops including cereals, grass, oilseed rape, potatoes, sugar beet and the less demanding horticultural crops.

#### **Subgrade 3b** - moderate quality agricultural land

Land capable of producing moderate yields of a narrow range of crops, principally cereals and grass or lower yields of a wider range of crops or high yields of grass which can be grazed or harvested over most of the year.

### **Grade 4** - poor quality agricultural land (21% of our area)

Land with severe limitations which significantly restrict the range of crops and/or level of yields. It is mainly suited to grass with occasional arable crops (e.g. cereals and forage crops) the yields of which are variable. In moist climates, yields of grass may be moderate to high but there may be difficulties in utilisation. The grade also includes very droughty arable land.

### **Grade 5** - very poor-quality agricultural land (12%, mostly above the Moor line)

Land with very severe limitations which restrict use to permanent pasture or rough grazing, except for occasional pioneer forage crops.

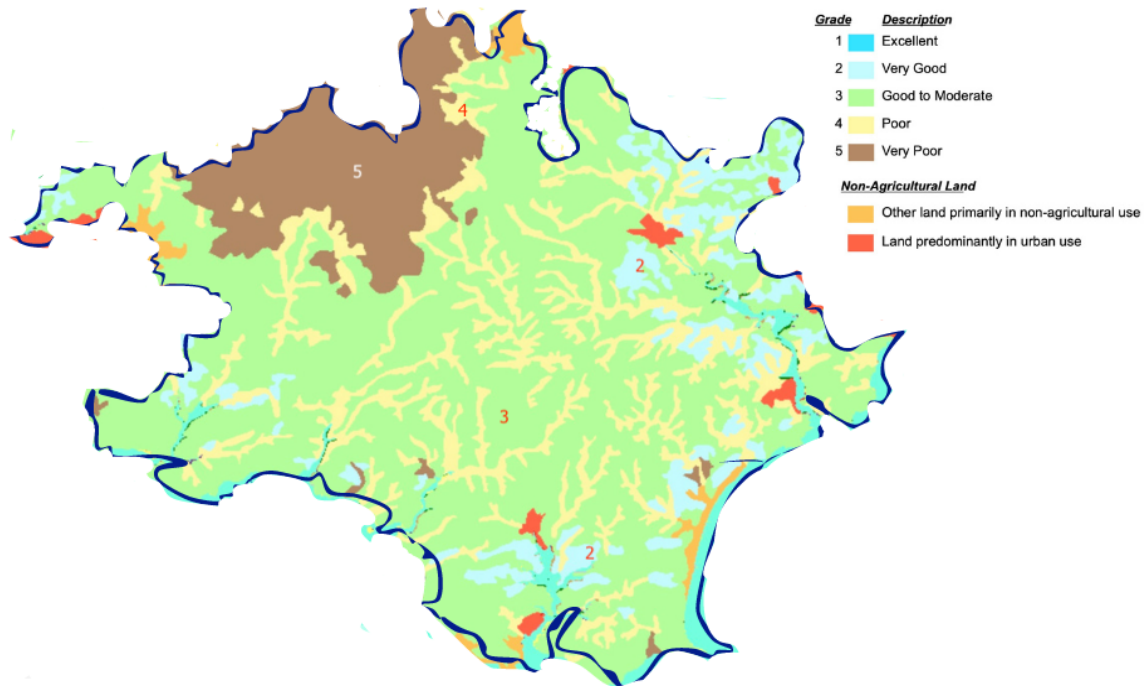
## The South Hams ALC

The South Hams farmscape is dominated by Grades 3 & 4, described as “Good to Moderate” & “Poor” in the classifications, respectively. There is also a reasonable amount of Grade 2 land, with the majority around Totnes & Salcombe.

This system of classification looks at the limitations of land, to summarise the usefulness. Limitations that the South Hams scores quite highly on – stoniness, drainage, steepness, soil depth, flood risk & organic matter levels. Classification falls into one of 5 grade, with Grade 3 split in some areas (not the South Hams unfortunately) into 3a & 3b. Given that our area is over half Grade 3, this would have been a useful split for our map:

Given the predominance of Grade 3 soil, it would have been useful to have the breakdown between 3a & 3b but this work was not undertaken in our area. The 52% listed above as Grade 3, equates to around 46,000ha of our 88,600ha within the South Hams, and if half of that sits in 3a (suitable for moderate yields of some cereals & horticultural crops), this along with the 8% classified as Grade 2 (7,400ha) adds up to 30,400ha which can grow arable and horticultural crops, albeit with careful management & sympathetic cultivations.





Soils Series	Description	Where?	% area	area ha	Live-stock only?	Arable?	Veg?	Comments
Grade 1	Excellent	None in the South Hams	0%	0ha	No	Yes	Yes	Unfortunately, the area recorded zero acres of Grade 1 land when the surveys were carried out. The nearest are Dawlish & Exeter
Grade 2	Very Good	Pockets of good soil near Totnes & Salcombe, typically sedimentary soils	8%	7,442ha	No	Yes	Yes	Useful soils, need feeding & suitable rotations to include roots & brassicas to most hubs
Grade 3	Good to Moderate	Spread evenly across the area everywhere below the lower Moor line	52%	46,072ha	No	Yes	Some	Grade 3 is a very broad category, subsequently split into 3a & 3b in some areas but not the South Hams. Our 46,000 ha will have both, our farmers will know where.
Grade 4	Poor	Spread fairly evenly across the area, with the majority either high, steep or both	21%	18,783ha	Yes	No	Some	These soils can be improved but more important soils will take preference.
Grade 5	Very Poor	Virtually all up above the lower Moor line	12%	10,632ha	Yes		Some, but not much	Mix of grazing and silva-pasture possible, sinks for C needs investigating
	Urban areas	Towns & villages	3.0%	2,658ha			Yes	Opportunities for community engagement & urban growing - many routes to market. Major towns will host hubs
	Rivers &	Mainly	3.0%	2,658ha				Plan harmonious farming practises

	streams	Southern edge, 5 main rivers						to improve river ecologies. Sewage treatment plants need more storage. On-farm reservoirs needed to stop Winter rains & irrigate in Summers or top rivers up
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## Appendix C – Daily Consumption Requirements

The table below is taken from the Bridport Report [ref 17] which uses 4 sources of data to produce an averaged list.

	Statista [13]	GOV [14]	FAO [15]	NDNS [16]	AVERAGE
	grams/person/day				
Beer	186.3	187.46	154.88	104.06	158.17
Cereals		421.36	352.66	221.32	331.78
Cider	30.63	22.31		8.32	20.42
Fruit, Orchard	37.2	38.82		22.13	32.71
Fruit, Soft	23.35	24.37		13.89	20.54
Fruit, Tropical	105.15	94.4		62.54	87.37
Juice, Orchard				9.53	9.53
Juice, Tropical				33.29	33.29
Legumes	14.5	10.42	21.1	6.89	13.23
Nuts	1			6.3	3.65
Oils, fats, spreads	24.14		42.47	1.85	22.82
Potatoes	91.85		181.45	38.84	104.05
Spirits	5.71	14.86	4.93	5.22	7.68
Sugar	13.28	49.75	66	23.9	38.23
Vegetables	169.78	160.28	237.1	106.08	168.31
Wine	38.28	56.54	55.62	38.63	47.27
Beef		43.51	47.53	26.82	39.29
Milk products	71.28			29.08	50.18
Eggs	14.28	25.06	30.77	20.6	22.68
Fish	21.86		49.07	29.05	33.33
Lamb		11.49	10.79	2.1	8.13
Milk	188.7	244.15	542.79	74.99	262.66
Pork		58.6	65.86	19.74	48.07
Poultry		82.59	89.67	55.82	76.02

**TABLE 1:** Reported daily consumption of different foods in the UK from different sources.

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