Bridport Food Security Plan

Contents

1 Scope

The food security plan covers the area within the bounds of the Bridport Local Area Partnership (BLAP). It considers the food supply needed for the current population (21780 as of 2021) and tourists (estimated at 88343 for an average stay of 4.45 days) but does not make estimates as to how population may change. Calculations are made considering current land use and quality, and do not factor in how this may change with continued cultivation.

2 Objectives

- Determine how much of the BLAP population's food requirements can be produced in the Bridport local area.
- Estimate how many farms and farmers would be needed to meet this demand, and how they can do so agroecologically.
- Factor in climate change and determine how local farms can increase their resilience to maintain food supply into the future.
- Outline ways in which food could be processed and distributed locally in order to provide the BLAP population with healthy and affordable food.
- Determine best policies and actions that the town council, parish councils, and local organisations could take to achieve this goal.

3 What does the Bridport Local Area look like?

The BLAP is a collection of parishes covering just over 18 thousand hectares of primarily agricultural land, containing approximately 29 settlements with a population just under 22 thousand. Within the area, most agricultural land (just over 11.5 thousand ha) is Grade 3

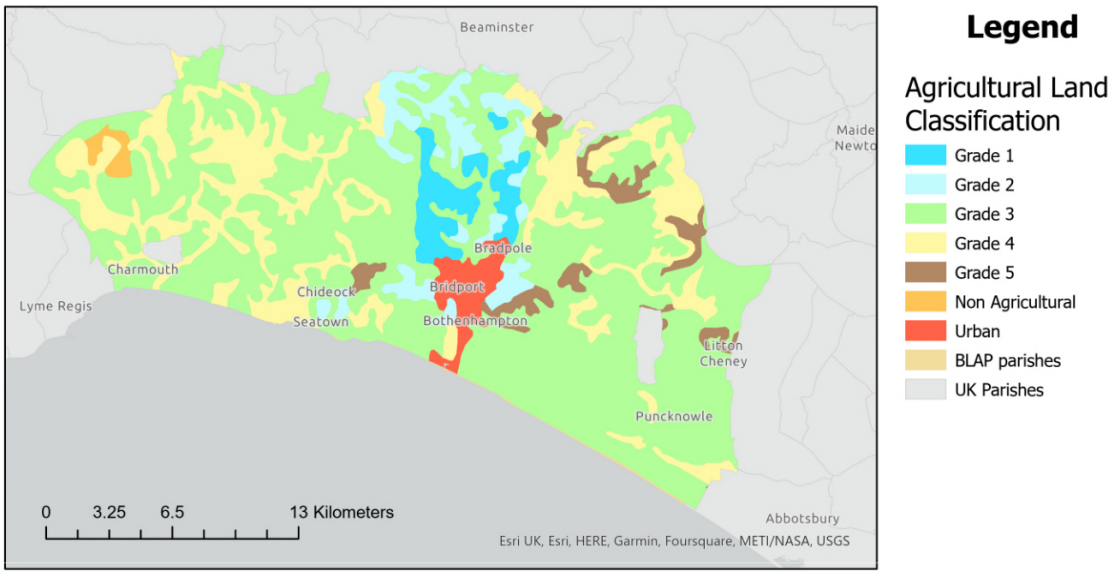

Figure 1: *Agricultural land classification across the BLAP area.*

(figure 1). This is moderately good land that is typically used for grazing but can be usable for arable crops with proper management. Grade 4 is the next most common, at 3.9 thousand ha.

This is land with substantial limitations, mainly suitable for grazing. Grades 1 and 2 comprise 716 ha and 1065 ha respectively. These grades are higher quality agricultural land suitable for a wide range of horticultural or arable crops. Grade 5 comprises only 680 ha. This is poor-quality land unsuitable for cultivation, which is used for rough grazing, woodland, or nature conservation.

The vast majority of the land is classified as an Area of Outstanding Natural Beauty (AONB), and all calculations and recommendations henceforth assume that the land is an AONB. Some of this is further classified as an Environmentally Sensitive Area (ESA), Local Nature Reserve (LNR), National Nature Reserve (NNR) or a Site of Special Scientific Interest (SSSI). LNRs and NNRs place strong restrictions on agricultural activity within their bounds. However, appropriate agroecological methods are permitted and even encouraged for ESAs and SSSIs.

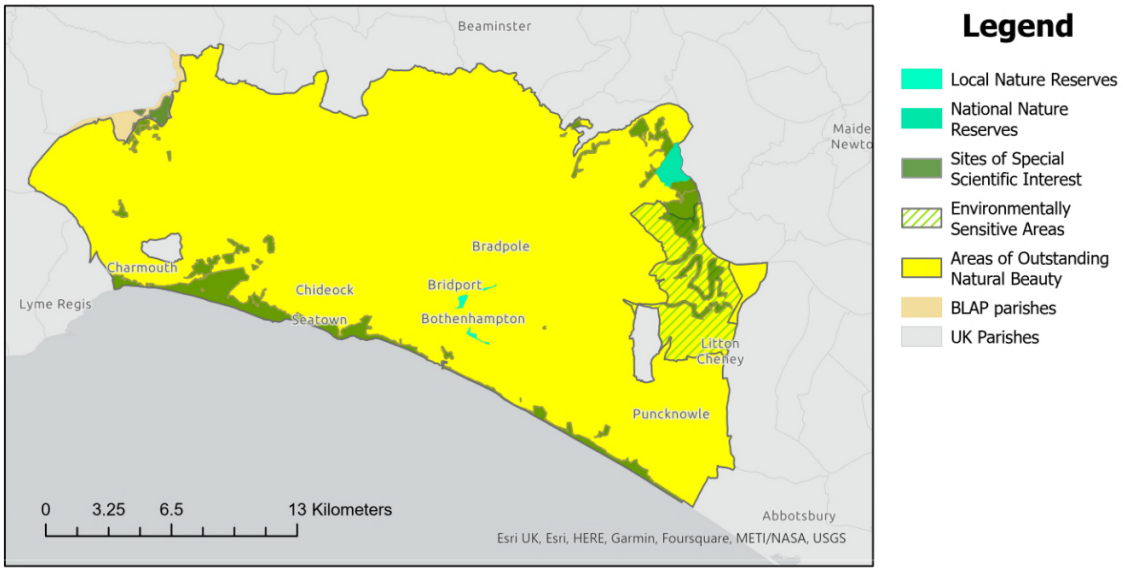

Figure 2: *Distribution of ESAs, NNRs, LNRs, and SSSIs across the BLAP area.*

There are 18603 hectares of land in the BLAP, of which 629 hectares are urban or otherwise non-agricultural land. Excluding the 97 hectares of land that are local or national nature reserves, 17974 are available for potential agriculture (table 1). 961 hectares of this are designated SSSIs, of which 184 are also within an ESA. These will be subject to the most severe restrictions. 885 more hectares are non-designated SSSI but are within the ESA, while 16128 fall outside of any designation beyond AONB.

	Land in each designation (ha)				
Grade	**SSSI**	**ESA**	**SSSI & ESA**	**None**	**TOTAL**
1	0	0	0	716	**716**
2	0	0	0	1065	**1065**
3	401	597	78	10491	**11567**
4	365	169	38	3374	**3946**
5	11	119	68	482	**680**
TOTAL	**777**	**885**	**184**	**16128**	**17974**

Table 1: *Area of land that is potentially available for agriculture within the BLAP boundaries, broken down by agricultural classification and designation.*

4 How much food does the Bridport Local Area require?

4.1 How much food is required right now?

Using consumption values reported by the UK's National Diet and Nutrition Survey 2020, constrained by production values reported in Agriculture in the UK statistics, daily consumption can be broken down into 16 categories (table 2). The Bridport Local Area Partnership (BLAP) had a population of 21780 as of 2021, of which 3550 are below the age of 20, 10542 are between 20-64, and 7688 are over 64. To account for tourist burden, which is not recorded for as small a scale as the BLAP area but is recorded for West Dorset, we can scale down proportionally by land area. However, is important to recognise that subsequent calculations are therefore estimates, as tourist burden will not be equally distributed across the constituency – particularly since BLAP covers a large section of coastline. In the West Dorset constituency, there are 488000 tourists of unknown age, staying for an average length of 4.45 days. The BLAP area is approximately 18.1% of the area of West Dorset and could therefore be estimated to receive 88343 tourists. If we assume they consume the same diet as a 20–64-year-old, the total amount of food required is 9405 tonnes (table 3).

	Consumed (grams/person/day)				
	Aged 0-9	**Aged 10-19**	**Aged 20-64**	**Aged 65+**	**Unknown**
Number	**1775**	**1775**	**10542**	**7688**	**88343**
Days fed	**365**	**365**	**365**	**365**	**4**
Beverages	43	81	186	151	186
Cereals and products	213	249	221	202	221
Fruit	120	86	99	136	99
Legumes	4	4	7	7	7
Nuts and seeds	1	2	6	4	6
Oils, fats, spreads	1	1	2	3	2
Potatoes and products	31	41	39	34	39
Sugar and confectionary	17	23	24	19	24
Vegetables and products	57	60	106	108	106
Beef and beef dishes	22	33	27	17	27
Eggs and products	14	13	21	18	21
Fish and fish dishes	27	18	29	44	29
Lamb and lamb dishes	2	3	2	7	2
Milk and dairy	156	142	104	150	104
Pork and dishes	13	18	20	16	20
Poultry and poultry dishes	36	53	56	25	56
TOTAL	**756**	**828**	**948**	**942**	**948**

Table 2: *UK National Diet and Nutrition Survey 2020 daily consumption values broken down by age and food category. Number of BLAP residents in each category and tourists are indicated.*

Of the 9405 tonnes consumed in the BLAP area, some of this will be imported. We can use UK level data to see that roughly 8632 tonnes of this will have been produced in the country and 773 will have been imported (table 4). We can then use an estimated conversion efficiency to tell us, for example, how many kg of potatoes or apples are required to make 1kg of the consumed products such as chips or apple juice. This allows us to convert the many different food products listed above into a few broader groups of produce. We also need to account for losses in each of these produce groups during primary production, such as waste when harvesting. By converting product demand to produce equivalent and then incorporating a buffer for primary waste, we can estimate that to produce the 8632 tonnes of domestically processed products, the UK would require approximately 13170 tonnes of produce, not including animal feed.

	Demand (tonnes/year)					
	Aged 0-9	**Aged 10-19**	**Aged 20-64**	**Aged 65+**	**Unknown**	**Total**
Number	**1775**	**1775**	**10542**	**7688**	**88343**	**110123**
Days fed	**365**	**365**	**365**	**365**	**4**	**1464**
Beverages	28	53	716	424	73	1294
Cereals	179	210	1107	738	113	2347
Fruit	114	82	555	557	57	1364
Legumes	3	3	32	24	3	65
Nuts	1	2	29	15	3	50
Oils	1	1	9	11	1	22
Potatoes	24	32	179	114	18	367
Sugar	13	17	104	59	11	203
Vegetables	44	47	493	368	50	1002
Beef	17	26	124	59	13	238
Eggs	10	9	81	53	8	160
Fish	23	16	151	166	15	372
Lamb	2	2	10	25	1	39
Milk	121	111	481	504	49	1265
Pork	10	14	91	54	9	178
Poultry	28	41	258	84	26	437
TOTAL	**617**	**664**	**4419**	**3253**	**452**	**9405**

Table 3: *Total amount of food required to feed the BLAP area for a year, broken down by age and food category. Number of BLAP residents in each category and tourists are indicated.*

If we include animal feeds, we can estimate that in total 15847 tonnes would be needed, of which 12161 tonnes of raw produce would need to be grown in the UK for direct consumption, animal feed, or processing, and 3686 tonnes grown elsewhere then imported (table 4).

To meet this demand the BLAP area would have to produce 5194 tonnes of cereals, 247 tonnes of fruit, 100 tonnes of legumes, 208 tonnes of oilseeds, 506 tonnes of potatoes, 832 tonnes of sugar crops, 672 tonnes of vegetables, 223 tonnes of beef, 163 tonnes of eggs, 306 tonnes of fish, 43 tonnes of lamb, 2874 tonnes of milk, 154 tonnes of pork, and 489 tonnes of poultry.

4.2 How much food would be required if we produced as much as possible locally?

The above figures all assume that diets and imports remain the same as at current. In a warming world, many global supply chains are increasingly at risk, with incidents such as the Beast from the East and the Ukraine war demonstrating how volatile supply and prices can be. It is therefore sensible to consider import substitution – that is, swapping imported products for those grown locally. The downsides may be that growing a crop locally takes more land than it would elsewhere, or that a crop cannot be grown locally and must be replaced with local cultivars. The BLAP area is fortunate in that its resources significantly exceed demand, so crops taking up more area is not a large issue.

4.2.1 Fruit and Vegetables

The UK imports over 40% of its vegetables and 55-85% of soft and orchard fruit. This is primarily due to more efficient production and longer seasons abroad. However, there are very few fruits and vegetables, except for tropical fruits, that cannot be grown domestically. In addition, fruit-based products can also be replaced by those manufactured here. Cider has a very strong local industry, as does non-tropical fruit juice, and both could feasibly be entirely locally supplied. Wine, however, is much more subject to location-based selection, so even though grapes can be grown here, maintaining a high level of imports is needed to provide

	BLAP Product Requirement (tonnes/year)			BLAP Produce Requirement (tonnes/year)		
	Total	**Domestic**	**Imported**	**Total**	**Domestic**	**Imported**
Beverages	1294	722	572	1131	822	309
Cereals	2347	2347	0	3278	2960	318
Fruit	1364	1364	0	1492	217	1275
Legumes	65	65	0	90	70	20
Nuts	50	50	0	50	0	50
Oil	22	7	14	17	4	13
Potatoes	367	367	0	693	506	187
Sugar	203	133	70	832	832	0
Vegetables	1002	1002	0	1268	672	596
Beef	238	238	0	271	223	47
Eggs	160	160	0	176	163	14
Fish	372	372	0	375	306	69
Lamb	39	39	0	40	43	-3
Dairy	1265	1148	117	2732	2874	-142
Pork	178	178	0	219	154	65
Poultry	437	437	0	505	489	17
TOTAL	**9405**	**8632**	**773**	**13170**	**10335**	**2834**
Animal cereals				1762	1591	170
Animal legumes				30	30	0
Animal oilseeds				885	204	681
TOTAL	**9405**	**8632**	**773**	**15847**	**12161**	**3686**

Table 4: *Total amount of product consumed in the BLAP area, broken down into product manufactured domestically and imported. Total amount of produce needed to manufacture domestic product, broken down into domestically grown produce and imports.*

the variety that people desire. Feasibly, cider and non-tropical juice imports could be reduced from 25.1% and 55% respectively to 0%, and wine imports from 92.6% to 50%. A shift in diet, so people ate 50% less tropical food, would need to be compensated for by a 75% increase in domestic fruit. In addition, imports of orchard (prev. 55.7%) and soft fruit (prev. 74.3%) and vegetables (prev. 42.8%) could be reduced to 0. This would increase local fruit demand to 1375 tonnes and local veg demand to 1268 tonnes.

4.2.2 Nuts

Nuts can be grown in the UK, but at the expense of a large loss in variety, so it would make sense to keep imports fairly high at 80% instead of 100%, which would increase local production demand to 10 tonnes.

4.2.3 Arable (human consumption)

The main grain that the UK imports which cannot be grown here is rice, which accounts for around 5.75% of cereals consumed directly by humans. However, cereal-based beer and spirits that are produced in the UK can be produced with UK-grown cereals. Similarly to wine, imports of beer and spirits should be maintained to maintain the variety that people are accustomed to, but these can be quite low. Currently, 25% of beer is imported, but the UK is a net exporter of spirits, primarily due to Scotland's production of malt whisky. Both beer and spirits could be imported at around 5% without significantly affecting selection. These changes would almost balance out, the reduction in cereals for spirits for export making up for the increasing cereals for direct consumption and for beer, to bring locally produced cereal demand to 5357 tonnes.
While around 34% of sugar and sugar products are currently imported, we are self-sufficient in the crops used to produce the remainder of the sugars we consume. Sugar and confectionary

imports, however, include the vitally important category of chocolates, so imports should be maintained at a low level. Reduction to around 15% would increase demand for local sugar crops to 1078 tonnes.
Potatoes can be entirely grown in the UK and imports could be reduced from 27% to 0%, increasing demand to 693 tonnes.
The UK is already self-sufficient in legumes, but imports 65% of oils, and 77% of oilseeds for UK-processed oils. Excepting olive oil, most other oils are substitutable for UK-produced varieties. However, UK oil crops are significantly lower yielding than overseas, and so oils are one of the categories that are less worth substituting if space is tight. Nonetheless, the amount of oils consumed directly by humans is relatively small, so reducing oil imports to 10% and oilseed imports to 0% is possible and increases local oilseed demand to 266 tonnes.

4.2.4 Arable (animal consumption)

While cereals can be entirely substituted with those of UK origin, and legumes already are primarily UK-grown, imported oilseeds and soy make up a large part of animal feed. This can be substituted for UK-grown produce without impacting animal health, but as mentioned above, yields are significantly lower for UK-grown oilseeds. Under an agroecological system, this has less of an impact, as ruminant animals are fed very little feed, so reducing all animal feed imports to 0% would be possible. This would change local cereal and oilseed demand to 5542 tonnes and 1005 tonnes respectively.

4.2.5 Animal Products

The UK is capable of producing essentially all animal products, with the exception of regionally protected dairy items such as parmesan. In fact, the UK is currently a net exporter of milk and lamb. All land meat, milk, and egg imports could be set to 0%, fish imports could be reduced from 18.7% to 10%, and dairy imports could be reduced to 20% from 40.1%. This would increase demand for locally-produced animal products to 271 tonnes of beef, 176 tonnes of eggs, 337 tonnes of fish, 40 tonnes of lamb, 3322 tonnes of milk, 219 tonnes of pork, and 505 tonnes of poultry.

4.2.6 Summary

By reducing imports as much as feasibly possible, the total amount of product consumed remains at 9356 tonnes but roughly 8868 tonnes of this will have been produced in the country (and for our purposes, within the Bridport local area) and 488 will have been imported. To produce the 8868 tonnes of domestically processed products, BLAP would require approximately 17131 tonnes of produce, of which 16413 tonnes would need to be grown locally and 717 would be imported (table 5). To meet this demand the BLAP area would have to produce 5542 tonnes of cereals, 1375 tonnes of fruit, 123 tonnes of legumes, 1005 tonnes of oilseeds, 693 tonnes of potatoes, 1078 tonnes of sugar crops, 1268 tonnes of vegetables, 271 tonnes of beef, 176 tonnes of eggs, 337 tonnes of fish, 40 tonnes of lamb, 3322 tonnes of milk, 219 tonnes of pork, and 505 tonnes of poultry.

4.3 How much food would be required if we ate a better diet?

The UK, like many Western countries, faces several dietary challenges, including high consumption of processed and sugary foods, excessive salt intake, low consumption of fruits and vegetables, and rising obesity rates. In order to improve the health of the BLAP population, it would be ideal to increase the amount of fruit and vegetables consumed to at least 5 portions per day, and to substitute some of the calories provided by sugar and fats with those provided by complex carbohydrates and proteins. In addition, though protein consumption is generally

	BLAP Product Requirement (tonnes/year)			BLAP Produce Requirement (tonnes/year)		
	Total	**Domestic**	**Imported**	**Total**	**Domestic**	**Imported**
Beverages	1294	897	397	1332	1332	0
Cereals	2347	2347	0	3278	3090	189
Fruit	1316	1316	0	1483	1032	451
Legumes	65	65	0	90	90	0
Nuts	50	50	0	50	10	40
Oil	22	19	2	45	45	0
Potatoes	367	367	0	693	693	0
Sugar	203	173	30	1078	1078	0
Vegetables	1002	1002	0	1268	1268	0
Beef	238	238	0	271	271	0
Eggs	160	160	0	176	176	0
Fish	372	372	0	337	37	0
Lamb	39	39	0	40	40	0
Dairy	1265	1207	58	3322	3322	0
Pork	178	178	0	219	219	0
Poultry	437	437	0	505	505	0
TOTAL	**9356**	**8868**	**488**	**14226**	**13508**	**717**
Animal cereals				1912	1912	0
Animal legumes				33	33	0
Animal oilseeds				960	960	0
TOTAL	**9356**	**8868**	**488**	**17131**	**16413**	**717**

Table 5: *Total amount of product consumed in the BLAP area, broken down into product manufactured domestically and imported, and total amount of produce needed to manufacture domestic product, broken down into domestically grown produce and imports, considering import reduction.*

sufficient, a lot is provided via meat, which can cause health issues in excess and is generally a more inefficient use of land than protein from eggs, dairy, and plant-based proteins.

4.3.1 More fruit and vegetables

In order to reduce overall imports, we have already considered raising domestic fruit consumption by 75% in order to reduce tropical fruit consumption, so we may not want to eat much more fruit unless we can start growing a greater diversity (which may be possible under climate change). In the meantime, if we increase the amount of veg we eat by 90%, this would mean that there would be 6.3 portions of F&V produced per person per day (for an average of 5 per day consumed). This would increase demand for local production of veg to 2409 tonnes.

4.3.2 Less oil and sugar

If we reduce consumption of sugars and oils by 33%, this reduces local production requirements to 722 tonnes and 713 tonnes respectively. However, this does mean we need to increase the amount of other foods eaten, such as cereals, in order to make up the calories. In general, the BLAP population is elderly, which means that the average calorie requirement is lower than 2000 per person per day. However, in order to buffer against fluctuations in demographics, it is best to assume that 2000 calories per person per day should be consumed, after accounting for household waste. The calorie boost could be achieved in a number of ways, such as a 60% increase in cereals, leading to a to a total local demand of 6844 tonnes.

4.3.3 Switching protein sources

A 33% reduction in consumption of meats could be achieved while maintaining adequate protein consumption, and would result in a significant reduction in the local land area required for animals. However, the calories would have to be replaced by others, such as by a 100 – 200% increase in consumption of plant-based proteins such as beans and peas. Further reductions to consumption of animal products such as dairy and eggs could be made, but these typically result in a greater increase in the land required for replacement calories than those saved by removing animals, since beef and lamb are the most inefficient users of land and dairy and eggs are less so. For these calculations we assume a reduction of 33% for beef, lamb, pork, and poultry, which would mean a local demand of 181 tonnes, 27 tonnes, 147 tonnes, and 339 tonnes tonnes respectively. Milk and egg demand remain constant at 3322 tonnes and 176 tonnes respectively. To counterbalance the reduction in protein and calories, local production of nuts and legumes should be increased by 110% to 21 tonnes and 212 tonnes respectively.

4.3.4 Summary

By substituting oils, sugars, and some meats with increased fruit, vegetables, cereals, and plant based proteins, we could produce a healthy diet that provides enough calories (2500 supplied for approx. 2000 consumed), protein (85g supplied for approx. 68g consumed) and fruit and veg (6.5 portions supplied for approx. 5.2 portions consumed). The total amount of product consumed is increased to 11691 tonnes, of which 11006 tonnes of this will have been produced in the country and 685 will have been imported. To produce the 11006 tonnes of domestically processed products, the UK would require approximately 18936 tonnes of produce, of which 18062 tonnes will need to be grown locally and 874 will need to be imported (table 6).

	BLAP Product Requirement (tonnes/year)			**BLAP Produce Requirement (tonnes/year)**		
	Total	**Domestic**	**Imported**	**Total**	**Domestic**	**Imported**
Beverages	1562	957	605	1426	1426	0
Cereals	3755	3755	0	5246	4944	302
Fruit	1316	1316	0	1483	1032	451
Legumes	137	137	0	189	189	0
Nuts	105	105	0	105	21	84
Oil	14	13	1	30	30	0
Potatoes	367	367	0	693	693	0
Sugar	136	116	20	722	722	0
Vegetables	1905	1905	0	2409	2409	0
Beef	160	160	0	181	181	0
Eggs	160	160	0	176	176	0
Fish	372	372	0	375	337	37
Lamb	26	26	0	27	27	0
Dairy	1265	1207	58	3322	3322	0
Pork	119	119	0	147	147	0
Poultry	293	293	0	339	339	0
TOTAL	**11691**	**11006**	**685**	**16869**	**15995**	**874**
Animal cereals				1361	1361	0
Animal legumes				23	23	0
Animal oilseeds				683	683	0
TOTAL	**11691**	**11006**	**685**	**18936**	**18062**	**874**

Table 6: *Total amount of product consumed in the BLAP area, broken down into product manufactured domestically and imported, and total amount of produce needed to manufacture domestic product, broken down into domestically grown produce and imports, considering dietary change and import reduction.*

To meet this demand the BLAP area would have to produce 6844 tonnes of cereals, 1469 tonnes

of fruit, 212 tonnes of legumes, 713 tonnes of oilseeds, 693 tonnes of potatoes, 722 tonnes of sugar crops, 2409 tonnes of vegetables, 181 tonnes of beef, 176 tonnes of eggs, 337 tonnes of fish, 27 tonnes of lamb, 3322 tonnes of milk, 147 tonnes of pork, and 339 tonnes of poultry.

5 How can food be produced in the Bridport Local Area?

To calculate the amount of land needed to meet this demand, we need to calculate:

1. Crop area - arable, orchard, and horticultural area for crops for human and animal consumption.
2. Grassland area - for stocking animals and for hay/silage cutting.
3. Infrastructure area - for housing animals plus additional roads, dwellings, sheds, etc. needed to run a business.

The area required to grow crops and to hold animals can be calculated fairly easily, using average yields per hectare and average stocking densities per hectare (table 7).

	Land Area Required (ha)				
	Arable	**Orchard**	**Horticulture**	**Pasture**	**Total**
Beverages	125	59	34	0	218
Cereals	1150	0	0	0	1150
Fruit	0	56	57	0	113
Legumes	70	0	0	0	70
Nuts	0	7	0	0	7
Oil	11	0	0	0	11
Potatoes	28	0	0	0	28
Sugar	11	0	0	0	11
Vegetables	0	0	125	0	125
TOTAL PLANT	**1395**	**122**	**216**	**0**	**1733**
Beef	0	0	0	1218	1218
Eggs	95	0	0	3	98
Fish	0	0	0	1	1
Lamb	20	0	0	201	220
Dairy	8	0	0	837	844
Pork	90	0	0	109	200
Poultry	366	0	0	6	372
TOTAL ANIMAL	**578**	**0**	**0**	**2375**	**2953**
TOTAL	**1973**	**122**	**216**	**2375**	**4686**

Table 7: *Amount of land required to meet the demand for food in the BLAP area, broken down by land category. This does not factor in infrastructure requirements.*

The infrastructure area is more difficult. This will depend on the number of farms and the approach each farm takes to production. In the UK, the average organic farm size is 85 ha [1]. However, organic crop enterprises have an average size of 19 ha as opposed to 165.1 ha for organic livestock. Similar trends are seen across the EU, with organic horticultural enterprises tending to occupy the smallest spaces, organic arable cropping intermediate, and organic grazing livestock the largest per farm. Therefore, we need to consider type of farm when making our calculations. There is also substantial variation in size for farms within a certain category, which tends to correlate with methods of retail and distribution [2]. For example, research based on organic veg growers in the USA found that nearly 90% of farms classed as 'large' sold over 75% of their produce via wholesale routes, whereas 74% of 'small' producers sold at least 75% of their produce directly to the consumer [3]. Therefore, to estimate how many small, medium, and large farms might be needed to meet the BLAP area demand, it is useful to consider how

such produce will be distributed to the population. Suggestions made hereafter combine a range of farm types and distribution systems.

5.1 Community Supported Agriculture (CSA) projects

CSAs allow consumers to purchase shares in a local farm. In return for upfront investment in the farm, members receive a share of the harvest. Investment can also take the form of labour, with community members helping out with planting, weeding, and harvests. This model provides farmers with upfront capital and a secure outlet for sales, and consumers with a steady supply of fresh, seasonal food. The community aspect can also provide myriad benefits for social wellbeing. The Landworkers' Alliance estimates that having one CSA initiative per village, two for smaller towns, and three for larger towns, would contribute significantly towards reducing barriers to access to nature and help to reconnect communities with each other and their food. For the BLAP area, this would equate to approximately 32 schemes, one each located near Allington, Bothenhampton, Bradpole, Burton Bradstock, Charmouth, Chideock, Eype, Fishpond Bottom, Litton Cheney, Loders, Melplash, Monkton Wyld, Morcombelake, Netherbury, Puncknowle, Ryall, Salway Ash, Seatown, Shipton Gorge, Stanton St Gabriel, Swyre, Symondsbury, Uploders, Walditch, West Bay, West Bexington, Whitchurch Canonicorum, Wootton Fitzpaine, Yondover, and three in or around Bridport. This would provide around a quarter of demand.

A small-scale agroecological vegetable farm CSA may require approximately 10% to 20% of the total land area for infrastructure. This can include space for a packing shed, greenhouses or polytunnels, irrigation systems, equipment storage, and an office. They are usually quite labour intensive and employ around 2 FTEs per hectare.

5.2 Market gardens

There would need to be a number of slightly larger horticultural farms to grow the remaining vegetables, potatoes, and soft fruit required, which would usually be distributed through shops, markets, and public procurement schemes. Ideally, some of these farms would be situated to the north of Bridport, where the highest grades of land are found. However, it may also be useful to have some further east and west in order to distribute supply.

Like a CSA, they may require approximately 10% to 20% of the total land area for infrastructure. However, they are usually less labour intensive, employing around 0.5 FTEs per hectare.

5.3 Integrated arable-livestock systems

Farms that raise grazing livestock as part of a rotation with arable crops and temporary grassland can contribute to both crop and animal production. Rotating between crop production and temporary grassland helps to build soil fertility and reduce disease, while grazing animals of crop leftovers reduces waste and enhances nutrition. Approximately 50% of their area should be grazed, and 50% grown as arable cereals, legumes, sugar beet, and oilseeds. These farms would be well suited to the wider countryside to the east and west of Bridport, where grade 3 and grade 4 land cover the majority of the landscape.

Integrated arable-beef farms may allocate approximately 5% to 15% of the total land area for infrastructure. This can encompass grain storage bins and equipment storage on the arable side, and barns or shelters, feed storage, and handling facilities on the livestock side. Dairy farms can require a more substantial amount of land for infrastructure, often around 20% to 30% of the total land area, as they include milking parlours. Similarly, beef systems require fewer employees at around 0.25 FTEs per hectare, while dairy require more per hectare to deal with milking at 0.5.

5.4 Specialist livestock farms

Small-scale pork and/or poultry farms that comply with ethical guidelines can produce eggs and meat sustainably. The manure is also of tremendous use in maintaining nitrogen balance in soils without using artificial fertilizers. However, it can be more difficult to distribute manure as pigs and chickens are less suited to rotation in between productive fields. Nitrogen management is therefore a large issue on many existing pig and poultry farms. By developing a network of these farms which are net exporters of nitrogen and those that require nitrogen inputs - primarily horticulture - a balance can be achieved. Though our calculations focus on free-range outdoor systems where the animals are on pasture, they are fed and do not require good quality grassland. Instead, locations are best determined by proximity to farms that require manure, and to processing facilities that produce feed-appropriate byproducts.

These farms may allocate 25% to 50% of the land area for infrastructure, including barns or coops, feed storage, and manure handling facilities. In addition, egg farms require areas for collecting, cleaning, and storing eggs. Due to their smaller size and higher livestock turnover, they usually employ more people at 0.5 FTEs per hectare.

5.5 Silvopasture

In the BLAP area, demand for orchard fruit and nuts is fairly low. However, trees are very valuable in providing ecosystem services such as sequestering carbon and supporting biodiversity. Sheep are ideal companions for trees, helping to keep grass low and maintain fertility under orchards, while the trees in turn help to provide shelter from the elements. In a silvopastoral system, around half of the area can be orchards, but the remainder should be pasture interspersed with non-fruiting trees that the sheep can be moved to during harvest season. This could be divided into farms as and where land is appropriate, as sheep are able to take advantage of fairly rough grazing.

These farms may allocate around 10% to 15% of the total land area for infrastructure, as livestock requirements are smaller and usually just require shelters, but orchards usually require a packing and sorting facility, storage for equipment and supplies, and cold storage for fruit. Harvests are more labour intensive and may require seasonal employment, but the rest of the year labour demand is lower at 0.25 FTEs/ha.

5.6 Vineyards

There are some existing vineyards in the area, but to meet demand there would need to be cultivation of a wider variety of grape varieties suitable for wine production, ranging from classic reds like Merlot and Cabernet Sauvignon to whites like Chardonnay and Sauvignon Blanc. They are similar to market gardens in that they cannot host livestock and require imported fertilization. Though yield would be highest on the grades 1 and 2 land, through practices such as cover cropping between vines, soil in poorer locations could become suitable for production.

Vineyards can allocate from 20% to 30% of land area for infrastructure depending on whether wine making facilities are located elsewhere. They still require space for equipment and storage. Similarly to orchards, harvests are more labour intensive and may require seasonal employment, but the rest of the year labour demand is lower at 0.5 FTEs/ha.

5.7 Fisheries

Fisheries are very complex and vary significantly in size, primarily depending on size of the fishing vessel. There are already numerous small fishing enterprises along the Dorset coastline.

Though the onshore area required to support fishing is small, it can be quite labour intensive, ranging from a few to over 10 employees.

5.8 Biodiversity centres

In addition to the farms producing food, it is vitally important to a local food system to have facilities that focus on seed saving and plant propagation, in order to ensure a resilient supply of locally adapted seeds for other farmers in the area. Often, these farms combine growing area with high quality equipment and storage facilities, and educational spaces where farmers can come to learn. An agroecological hub near Bridport would be ideally placed to support many farmers throughout the region.

In addition to the land needed for growing various plant species and their respective varieties, farms may allocate up to 40% of land area for infrastructure for seed cleaning, drying, sorting, and long-term storage, such as drying racks, temperature-controlled storage rooms, and seed vaults designed to preserve seed viability over extended periods. Usually, offices are required for extensive recording, cataloguing, and managing data on seed accessions, then there is also space required for educational programs, workshops, and public outreach activities. Along with the increased range of activities, there is a higher demand for employment.

5.9 Communal processing facilities

In addition to the farms listed above, communal processing facilities may be of use for the region in order to maintain the high variety of processed goods that people are used to.

- Beverages: To produce juices and alcohol, in addition to the existing local producers, communal facilities with presses, brewing and fermentation equipment, storage tanks, bottling or canning facilities, and cellars for storage would help to increase local beverage production. This could be combined with a tasting room or pub to help promote local products and create a sense of community around craft beverages.
- Cereals: Some producers, such as Tamarisk Farm, already provide some amount of local cereals. To expand local bread and flour production investment in larger bakery and flour mill would be beneficial, as small-scale facilities on individual farms can be cost-prohibitive. This would need industrial ovens, mixers, milling equipment, and storage for grains and flour. In addition, larger scale cereal processing facilities with specialised equipment for dealing with a variety of grains could help to support greater cereal diversity.
- Oils: For oil production, an oilseed processing plant is required, featuring oilseed cleaning and conditioning equipment, oil extraction presses or expellers, refining and filtration machinery, and storage and packaging lines.
- Sugar: For sugar production, the area would need a sugar mill equipped with crushing machinery for sugar beet, juice extraction and purification equipment, evaporation and crystallization units, and packaging facilities.
- Vegetables: To process legumes, potatoes, and other vegetables, communal facilities and equipment could include washing and cleaning stations, sorting and grading machinery, cutting and slicing equipment, blanching and steaming systems, and packaging lines. Depending on the specific crops and community preferences, various products can be made. For legumes like beans and lentils, processing may involve sorting, cleaning, and packaging for direct consumption. Potatoes can be processed into products such as chips and mash. Other vegetables can be frozen, canned, pickled, or made into vegetable sauces or soups. By establishing these processing facilities, the area could extend the shelf life

of its produce to allow more consumption of non-seasonal produce, as well as creating value-added products that support local food security and economic development.

- Meat: Efforts should be made in maintaining the local abattoirs, and increasing access to cutting and processing rooms, refrigeration for meat storage, and packaging facilities. Additionally, the community could explore options for charcuterie and value-added meat products.
- Dairy: There are several small local dairies, but investment in a larger scale communal dairy processing plant could support more small farmers entering the business. This facility would include pasteurization and cheese-making equipment, milk storage tanks, and packaging lines. Producing a variety of dairy products like cheese, yogurt, and butter would add to the value of dairy production.
- Fish: To increase the amount of local catch that is sold and consumed locally, investment in facilities with fish cleaning and filleting stations, seafood cooking and smoking equipment, freezing and cold storage, and packaging lines could help. This would allow fisheries to diversify from fresh sale via fishmongers to add in filleted and portioned fish for retail sale, smoked and cured fish products, seafood soups and stews, frozen fish fillets or seafood mixes, and canned fish products.

How much area each occupies and how many employees they are likely to need will be highly dependent on circumstance.

5.10 Summary

By allocating between 10-50% extra area for infrastructure, as described above, we can gain a rough idea of how much total area might be required for the various types of farm in the BLAP region (table 8). By making a rough guess at how many separate enterprises there may be, we can also determine the average land size of each farm. Though in practice it is likely to be much more variable, this can help paint a picture of what local food production could look like in the BLAP area.

	Farms (no)	**Growing area (ha/farm)**	**Infrastructure area (ha/farm)**	**Total area (ha/farm)**	**Total area (ha)**
CSA	32	1.0	0.2	1.2	38.4
Market garden	5	30.0	3.0	33.0	165.0
Arable beef	25	100.0	10.0	110.0	2750.0
Arable dairy	25	65.0	19.5	84.5	2112.5
Chickens or pigs	10	12.0	3.6	15.6	156.0
Agroforestry	4	80.0	12.0	92.0	368.0
Vineyards	1	34.0	6.8	40.8	40.8
Fish	5	0.0	1.0	1.0	5.0
Seeds	1	3.0	1.5	4.5	4.5
TOTAL	**108**				**5640.2**

Table 8: *Estimated number of farms of various types needed to produce enough food to supply the BLAP area produce demand, plus breakdown of area required per farm and total area demand for the region.*

In addition, we can use type of farm and total area to gain a rough estimate of how many employees might be required in the farming industry (table 9). Though once again it is likely to be much more variable than calculations show, this could help to guide recruitment and training efforts in the area.

	Farms (no)	Labour (no/ha)	Labour (no/farm)	Total labour (no)
CSA	32	2.0	2.4	76.8
Market garden	5	0.5	16.5	82.5
Arable beef	25	0.3	27.5	687.5
Arable dairy	25	0.5	42.3	1056.3
Chickens or pigs	10	0.5	7.8	78.0
Agroforestry	4	0.3	23.0	92.0
Vineyards	1	0.5	20.4	20.4
Fish	5	10.0	10.0	50.0
Seeds	1	2.0	9.0	9.0
TOTAL	**108**			**2152.5**

Table 9: *Estimated number of farms of various types needed to produce enough food to supply the BLAP area produce demand, plus breakdown of labour required per farm and total labour demand for the region.*

6 How can food be distributed in the Bridport Local Area?

Farms should have access to various options for marketing and distributing food to the local population, which will allow farmers to have multiple income streams, and ensure that different parts of the community all have access to fresh food. Development of a local supply chain on a community level is of the utmost importance, as participating in regional food networks can greatly enhance a farm's presence in the local food system, communally developed and easily accessible infrastructure to support online systems for multiple producers can help to organise production and distribution on a regional scale. Key methods that should be considered in the BLAP area are discussed in this section.

6.1 Community Supported Agriculture (CSA) projects

As described above, CSAs offer a reliable stream of income for farmers and produce for consumers. By locating themselves near population centres, CSAs may be more accessible to people that are less able to visit weekly markets.

6.2 Farmers' markets and mobile markets

Participating in farmers' markets is a direct and popular way for farms to sell their produce, as evidenced by the ongoing popularity of Bridport Market. Additionally, use of mobile markets, like the Charmouth Dragon, could use trucks or trailers to bring fresh produce to underserved areas or communities with limited access to fresh food if demand was high enough. These markets provide opportunities for face-to-face interactions with customers and the chance to showcase fresh, seasonal products.

6.3 On-farm or local stands

These stands, like Little Oak's "Little Shop" in Wootton Fitzpaine and the "Moo Shed" milk vending machine in Axminster offer a low effort way for farms to sell their products directly to local customers. These stands are often located at the farm or in strategic locations within the community, and operate without employees on an honesty box or cashless system.

6.4 Local farm shops and supermarkets

Farms can partner with existing grocery outlets in the area to supply fresh produce and other products. These collaborations support expand market reach and offer a more convenient way for consumers to access produce without changing their existing routines.

6.5 Restaurants and cafes

Farm-to-table partnerships with restaurants and cafes can be mutually beneficial. These establishments source fresh ingredients directly from local farms, promoting sustainability and showcasing regional flavours. Many restaurants and cafes already source at least some of their produce from local producers.

6.6 Box schemes and delivery services

Farms can partner with food delivery services to reach customers' doorsteps, or they can personally offer subscription box services, delivering a curated selection of fresh produce, meats, or specialty items to subscribers' homes regularly.

6.7 Public procurement

Partnering with schools, hospitals, and other institutions to supply fresh, locally sourced food can be a reliable market for farms. This supports healthy eating initiatives and fosters community ties. Currently, the BLAP area has multiple schools and a hospital which could source the majority of their food from local producers if demand was high enough.

6.8 Agritourism

Farms can diversify their revenue streams by offering agritourism experiences like farm tours, workshops, and pick-your-own opportunities. These activities provide additional income while educating the public about agriculture. This could be particularly beneficial for farms offering specialty products, such as a local vineyard or orchard.

6.9 Online

Many farms have established online platforms for selling their products. Customers can place orders through websites or mobile apps, and farms can arrange delivery or pickup options. Online sales offer convenience and reach a broader customer base. The infrastructure to support online sales systems can be a barrier, but more publicly available systems such as ooooby.com are expanding access to farmers and consumers.

7 How can this be achieved, now and in the future?

7.1 Changing diets

Promoting dietary shifts toward more seasonal produce, reduced sugar and oil consumption, increased fruit and vegetable intake, and less meat consumption in both the local and tourist populations will a multi-faceted approach. A large part will come in affecting access and affordability of different foods to affect supply, while another part will come from educating consumers in order to change demand.

In order to increase supply and demand of seasonal produce and fruit and vegetables, and to decrease supply and demand of sugar, oils, and meats, actions taken could include:

- Launching public awareness campaigns that emphasize the health and environmental benefits of seasonal and plant-based diets. These campaigns can use social media, local newspapers, and community events to reach a broad audience. Celebrity appearances and special seasonal menus at events could help to excite people about the potential for healthier food.

- Encouraging restaurants and food vendors to offer more seasonal, plant-based menu options. Consider offering incentives or recognition for establishments that prioritise local and sustainable ingredients.
- Organising workshops and educational programs on seasonal eating, nutrition, and cooking skills. These can empower residents to make healthier dietary choices.
- Increasing support for local food cooperatives, food banks, and meal-sharing programs that prioritize seasonal and nutritious foods. These initiatives can help vulnerable populations access healthier options. Re-establishing a framework and funding to extend the public procurement programmes to supply more local schools and the hospital would also be an effective way to increase the sustainability and health value of a large portion of the population's diet.
- Establishing direct trade links with regions abroad to create sustainable avenues for importing produce such as tropical fruit that cannot be grown locally. Twinning of the Bridport Bioregion with these regions could increase enthusiasm about the idea and attract funding.

7.2 Increasing the number of agroecological farms and farmers

In order to increase the number of farms producing locally, there would need to be increased access to land, training, and finance; and there would also need to be increased recruitment of interested individuals.

- Identify and allocate publicly owned or unused land for agroecological projects. This could be put into a land trust or other scheme so that farmers can lease or buy land at affordable rates if they are committed to sustainable agriculture. Interested new entrants could be connected to land via this scheme.
- Establish educational programs or workshops on agroecological farming practices. Partner with local agricultural experts or organisations, such as Kingston Maurwood and Schumacker College to offer training sessions for aspiring agroecological farmers. In addition, establish or support existing farmer-to-farmer networks that allow farmers to share knowledge, resources, and experiences.
- Establish advisory services to help small businesses such as CSAs with start-up troubles, such as planning permission, making a business plan, and establishing a distribution network and online presence.
- Support existing projects that aim to educate and encourage new entrants to farming, such as the Landworkers' Alliance 'farm-start' and 'farm-incubation' projects around the UK, which is locally managed by Tamar Grow Local.
- Provide grants, subsidies, or low-interest loans to farmers interested in transitioning to agroecological methods to help cover the costs of transitioning and implementing sustainable practices. Funding can come from multiple sources, including grants and awards, money raised via council tax or business tax changes, and contributions from interested organisations and individuals. Projects such as "Seeding our Future" could help to gather and oversee these funds.
- Develop policies that prioritize agroecological practices in land use planning and zoning regulations, and support uptake of grants and existing schemes that do so, such as the Farming in Protected Landscapes grant and the Sustainable Farming Initiative. Local advisory services that help farmers take advantage of these schemes could encourage mixed

land use that includes farming for local food production alongside biodiversity conservation.

- Increase outreach to schools and education about routes into farming and sustainable methods of farming and processing food.

7.3 Creating a local food supply chain

If production of food can be increased locally, the infrastructure needs to be in place to allow it to be distributed and consumed in the area. This can range from aiding farmers in accessing markets, to making sure consumers can access and afford fresh local food.

- Provide support and incentives for local farmers' markets and community-supported agriculture (CSA) programs. Stakeholders can help establish and promote these markets as sources of fresh, seasonal produce.
- Invest in infrastructure like community gardens, urban orchards, and food forests. These initiatives can encourage residents to grow their own produce and connect with seasonal foods. Allocate resources to build or renew existing infrastructure for local food storage, processing, and distribution. This may include cold storage facilities, community kitchens, and food hubs.
- Invest in developing an online software or tools that will allow farmers to link up to existing local food networks, such as ooooby, an online tool for small scale producers.
- Creation of a Local Food Infrastructure Fund to support community-led initiatives by co-operatives and individuals, such as opening new businesses or establishing new educational programmes.
- Creation of a wholesale network connecting public procurement schemes, restaurants, and other retail outlets with farmers. This could help distributors to work with farmers to plan rotations and recipes. Implement policies that require town institutions like schools and hospitals to prioritize local food procurement. Set targets for the percentage of locally sourced food in institutional meals.
- Review local regulations related to food production, processing, and sales. Identify and push for removal of barriers that may hinder the development of local food systems.

7.4 Increasing sustainability and climate resilience

Farms in the area will be increasingly under the threat of unpredictable weather due to climate change. Several strategies that ought to be considered to increase resilience of agriculture include:

- Diversification of the range of crops and varieties cultivated so farmers can select crops better suited to changing temperatures and precipitation. This diversity in crop choices not only helps mitigate the risks associated with changing weather patterns but will also ensure a steady supply of fresh produce to meet the needs of the local community. CSAs and market gardens might choose heat-tolerant vegetables like drought-resistant sweet potatoes and okra, cold-hardy options such as kale and Brussels Sprouts, and quick-growing varieties like radishes and salad leaves. In the realm of soft fruits, resilient berry varieties like blackberries, raspberries, and blueberries can thrive in varying conditions. Orchards and vineyards may explore resilient and climate-adaptive fruit and grape varieties that are produced in Southern Europe. Cereal farmers will also need to select resilient varieties such as heritage grains like spelt, emmer, and einkorn, which exhibit adaptability. Diverse wheat varieties, including winter and spring types, offer flexibility in response to

changing seasons and temperatures. Barley, oats, rye, and triticale are currently being examined for their hardiness and suitability. Oilseeds like soybeans and sunflowers face threats from changing growing seasons, increased pest and disease pressures, and water stress due to altered precipitation patterns. Similarly, sugar beet farming is impacted by warmer winters, heightened pest and disease risks, fluctuating water availability, and heat stress during the growing season. Drought-tolerant and disease-resistant varieties are under development. Local adaptation and ongoing research through biodiversity centres can help to identify which cereal varieties best match the specific regional conditions. In addition to diversity in crop varieties, farmers can consider diversifying the environment on the farm through adding new species of trees throughout the area. These can aid in attracting diversity but also create smaller microclimates, especially on previously large uninterrupted fields such as pastures. Windbreaks, shading, and canopy management techniques can moderate temperature and reduce heat stress on crops and animals.

- Improving water, soil, and pest management. Given the increased unpredictability of rainfall and prolonged periods of drought, investing in advanced irrigation systems can be crucial. Efficient water management practices, such as drip irrigation and soil moisture monitoring, can optimize water use while ensuring crops receive adequate hydration during dry spells. In addition, implementing practices like cover cropping, reduced tillage, and organic matter addition can improve soil structure and water retention. Healthy soils are better equipped to withstand extreme weather events and provide essential nutrients to crops. Part of maintaining healthy soils is reducing chemical use. Implementing integrated pest management strategies, which focus on biological control methods and reduced pesticide use, can help manage any changing pest and disease dynamics under climate change while preserving beneficial insect populations and reducing soil degradation.
- Collaborating with agricultural research institutions who are carrying out continual monitoring can help farmers access the latest climate-resilient technologies and practices. Staying informed about innovations in crop breeding, pest management, and sustainable agriculture can greatly benefit farm operations. In addition, staying up to date on information as climate change progresses can be used to plan planting and harvest times and other management practices in response to anticipated weather patterns. Building networks and partnerships with neighbouring farms and local agricultural organisations can help with this through fostering knowledge exchange and collective responses to climate challenges. Sharing experiences and resources can strengthen the resilience of the entire agricultural community.

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