

1 **Enhancing domestic consumption to deliver food**
2 **security in a volatile world**

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13 **Intelligence Briefing**

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17 **Intelligence Briefing - Enhancing domestic consumption to deliver food**
18 **security in a volatile world**

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20 **Non-Technical Summary**

21 Global conflicts and the pandemic reveal the risks of food import reliance. In the UK,
22 pandemic, Brexit, and Ukraine war caused food price spikes. To bolster food security, the UK
23 needs to produce and consume more domestically, including nutrient-rich bivalve molluscs.
24 Current mollusc exports hinder domestic food sources. Promoting domestic consumption
25 through convenient, attractive products and taxing unhealthy processed foods can help.
26 Reducing reliance on food trade is crucial amid global instability and climate change. The
27 UK's mollusc export issues illustrate food security risks of excessive reliance on international
28 trade.

29

30 **Technical Summary**

31 Here we examine the critical issue of food security in the context of international volatility,
32 emphasizing the risks associated with an excessive reliance on food trade. The UK's
33 experience with disruptions caused by the pandemic, Brexit, and the Ukraine war, resulting
34 in a significant surge in food prices, serves as a pertinent case study.
35 The research underscores the potential benefits of increasing domestic food production and
36 consumption to enhance resilience against global events. The UK's current production,
37 export, and import statistics are analysed, with a particular focus on the fish and seafood
38 sector. The study highlights the bivalve mollusc industry, such as blue mussels, as an
39 example of an underutilized domestic resource.

40 Bivalve molluscs are rich in essential micronutrients, yet their consumption in the UK is low
41 compared to other countries. We propose strategies to boost domestic demand, including
42 incorporating bivalve meat into processed food products, utilizing advanced technologies to
43 improve taste and texture, and government intervention through taxes on unhealthy
44 processed foods to promote better nutritional profiles.

45 In summary the study emphasises the need for greater self-sufficiency in food production to
46 mitigate vulnerabilities resulting from an overreliance on food trade in the context of
47 international conflicts and climate change

48

49 **Social Media Summary** (120 characters)

50 Failure to effectively utilise domestic food resources and overreliance on trade threatens
51 food security in an increasingly volatile world

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53 **Main Text**

54 Recent international disputes and a global pandemic have demonstrated how an
55 overreliance on food trade and failure to effectively utilise and consume domestic food
56 resources places a threat to the food security of sovereign nations. In the UK, a triple
57 barrage of the coronavirus pandemic, Brexit, and the Ukraine war led to chaotic disruption
58 in food trade and supply issues. This contributed to the fastest rise in food prices for 14
59 years, with a 13% increase in the 12 months to August 2022 (ONS, 2022).

60

61 Greater production and consumption of food on a domestic level can provide resilience
62 against global events. The UK currently produces just 60% of the food it requires and
63 exports part of this production; in 2021 the UK imported £48 billion of food and exported

64 £21.4 billion (ONS, 2022). Imports and exports of fish and seafood are particularly large -
65 fish and seafood are the most-traded commodity worldwide - and the UK imports 81%
66 (718,000 tonnes) of the 887,000 tonnes it consumes, while exporting 70% of production
67 (WWF, 2022). A good example of how increased domestic consumption could provide
68 greater efficiencies and bolster food security in the UK is the bivalve mollusc industry, which
69 produces species including the blue mussel (*Mytilus edulis*). In 2019, the UK produced
70 79,000 t of bivalve molluscs, equivalent to 11% of UK fish and seafood consumption, yet
71 exported 68,000 t (86%) (Figure 1a) (FAO, 2022). With the onset of Brexit and the EU-UK
72 Trade and Cooperation Agreement on January 1st 2021, the UK was unable to export most
73 of its mollusc production, as UK water quality standards did not meet with import
74 requirements to the EU, the UK's main market (Seafish, 2022). In addition, the UK's reliance
75 on overseas depuration facilities in the Netherlands meant that following Brexit bivalve
76 molluscs could not be cleaned. As a result, seafood was left rotting in shipyards and farmers
77 were unable to sell their stock (SAGB, 2022).

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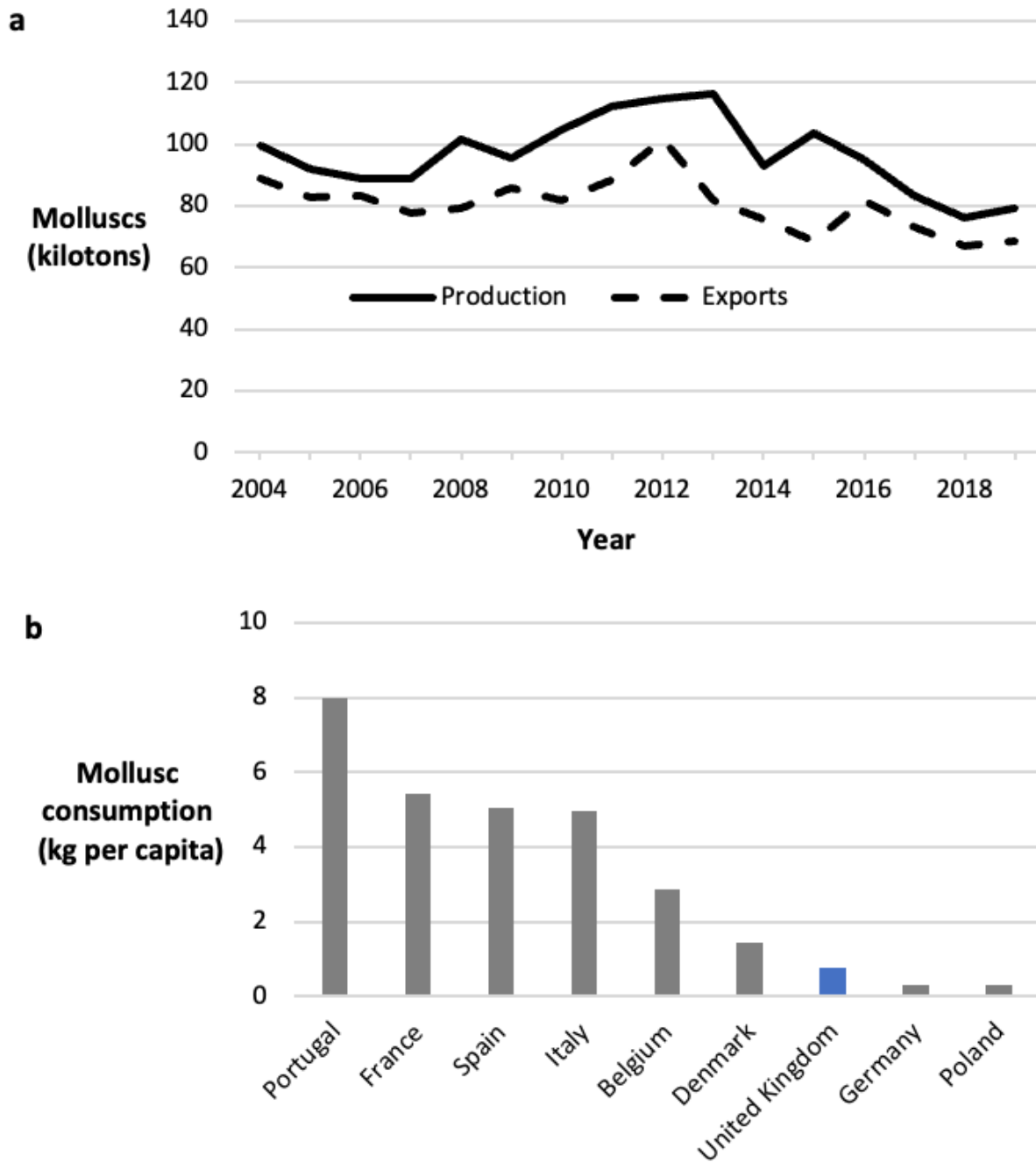
79 Bivalve molluscs are an incredibly micronutrient-rich food source, being one of the best
80 sources of zinc, iron, selenium, and vitamins A and B₁₂. Consuming mussels three times per
81 week has been shown to improve the Omega-3 index in UK adults, a key indicator of
82 cardiovascular health (Carboni et al., 2019). Despite their value as a food, bivalve mollusc
83 consumption in the UK currently stands at just 0.7 kg per capita, compared to 8 kg per
84 capita in Portugal (Figure 1b) (FAO, 2022). Increasing the UK's domestic demand for
85 molluscs is challenging but possible. Central to increasing demand would be the
86 manufacture and retail of products that are genuinely attractive and convenient to
87 consumers – with UK consumers citing poor taste and texture and inconvenient

88 preparations as major reasons for not eating bivalve molluscs (Willer et al., 2021). Including
89 bivalve meat in place of fish within familiar, processed, value-added food products – such as
90 fish fingers, cakes, and pies – may be the most effective means to do this (Willer et al.,
91 2021), with scope to use novel nano or microencapsulation technologies to mask any off-
92 putting flavours (Madene et al., 2006; Willer & Aldridge, 2020). In parallel, government
93 would be wise to introduce taxes on problematic components of processed foods (e.g.
94 refined sugars and vegetable oils) to encourage food manufacturers to improve the overall
95 nutritional profile of their offering to help address the overweight and obesity crisis (Gulati
96 & Misra, 2017).

97

98 Current global instability has brought into focus the need for greater self-sufficiency,
99 whether it is for the dependable supply of energy or food. Considerable attention has been
100 given to re-thinking national energy strategies, but building greater resilience into national
101 food systems also deserves more consideration. The UK's bivalve mollusc exports provide
102 just one case of the vulnerabilities resulting from an overreliance on food trade for food
103 security –with vegetable oil and wheat supply disruption in the Ukraine war another key
104 issue. This is exemplified by Somalia and Benin's 100% dependence on wheat imported from
105 Ukraine and Russia, with the current war disrupting and even severing supply chains
106 (Christie et al., 2022; UN, 2022). Climatic change will likely intensify the disruption of global
107 food systems and the next pandemic or drought may be just around the corner. Food trade
108 is important, but overreliance in an increasingly volatile world seems unwise.

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111

112 **Figure 1. Bivalve mollusc trade and consumption.** Panel a shows bivalve mollusc production
 113 and exports in the UK between the years 2004 and 2019. Panel b shows annual bivalve
 114 mollusc consumption per capita across European nations in 2019 – the most recent year for
 115 which FAO data is available. Figure created using data from (FAO, 2022).

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121 D.F.W. and D.C.A. wrote the final manuscript and approved the manuscript before
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123

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129 **Conflicts of Interest**

130 Conflicts of Interest: D.F.W. and D.C.A. declare none.

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132 **Research Transparency and Reproducibility**

133 All data is available in the manuscript.

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