

Question 2

**PER CAPITA PRODUCTION OF STAPLE FOOD CROPS
IN HEARTH-OF-DOMESTICATION COUNTRIES**

| Country | Corn (maize) (pounds per capita) | Potato (pounds per capita) | Rice (pounds per capita) | Yam (pounds per capita) | Cassava (manioc or yuca) (pounds per capita) |
|----------------|--|--------------------------------------|------------------------------------|-----------------------------------|--|
| | Hearth: Mexico | Hearth: Peru | Hearths: China and Mali | Hearth: Niger River basin | Hearth: Amazon River basin |
| Brazil | 1,056 | 39 | 108 | 3 | 183 |
| China | 412 | 145 | 333 | 0 | 52 |
| Mexico | 471 | 31 | 4 | 0 | 0 |
| Nigeria | 121 | 15 | 93 | 549 | 618 |
| Peru | 107 | 362 | 216 | 0 | 13 |

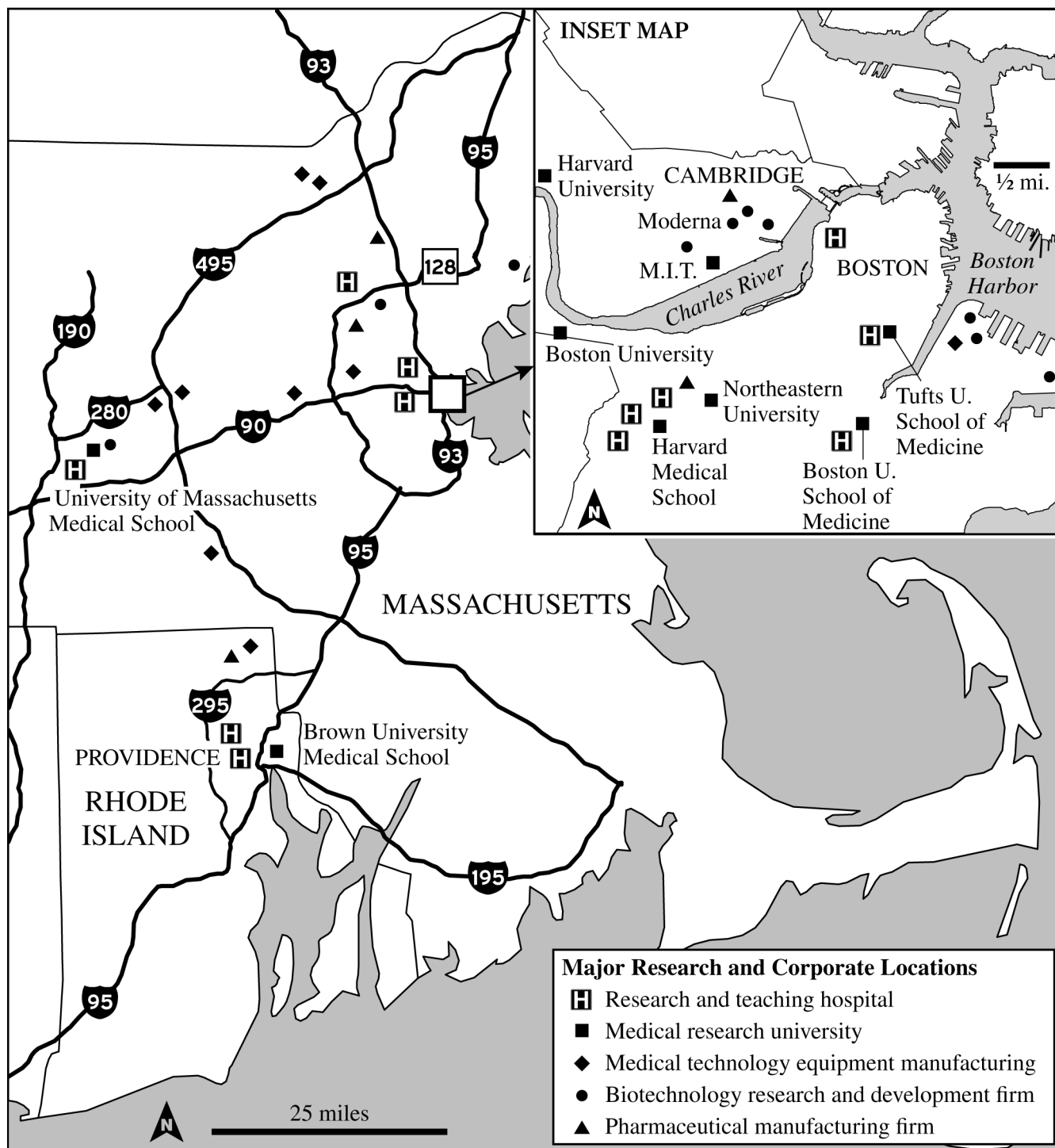
Source: Food and Agriculture Organization of the United Nations

2. Staple food crops provide most of the carbohydrates in people's diets, and some staples are also used as animal feed or in the distillation of ethanol. Cassava is a root crop (tuber) that is the source of farinha, tapioca, and the pearls in bubble tea.
- Describe the concept of an early hearth of domestication.
 - Identify the crop listed in the table that has diffused the least from its hearth of domestication to the countries listed in the table.
 - Explain how food preferences can be a culture trait.
 - Explain how the Columbian Exchange contributed to a crop's diffusion beyond its hearth of domestication.
 - Explain how the data in the table support the concept of a crop's consumption pattern being the result of globalization.
 - Explain why a crop may be farmed intensively in a less developed country and be farmed extensively in a more developed country.
 - Explain ONE way the global supply chain links crops such as those listed in the table to consumers in other countries.

Begin your response to this question at the top of a new page in the separate Free Response booklet and fill in the appropriate circle at the top of each page to indicate the question number.

Question 3

MAJOR MEDICAL AND BIOTECHNOLOGY COMPANIES AND INSTITUTIONS IN THE BOSTON AND PROVIDENCE REGION



Source: National Institutes of Health

The inset map shows the downtown areas of Boston and Cambridge, Massachusetts.

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| (D) | Explain ONE reason why RNI in urban areas may vary significantly from RNI in rural areas in the same country. | 1 point |
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Accept one of the following:

- D1. Urban populations tend to have fewer children than rural populations due to the reduced need for agricultural labor.
 - D2. The cost of living in urban areas (e.g., housing, schools) tends to be higher than in rural areas, and this may incentivize women to have fewer children leading to a lower RNI.
 - D3. Women in urban areas tend to have greater access to health care, health education, and/or family planning resources, which reduces the probability of having or the propensity to have children (fecundity).
 - D4. Women in urban communities commonly work outside of the home, having less time to care for children.
 - D5. Families in urban housing tend to have less space to house children.
 - D6. Women in urban areas tend to have higher levels of education, which reduces the probability of having children, the propensity to have children (fecundity), and/or delays the age at which women have children.
 - D7. Women in urban areas tend to have more political power, which reduces the probability of having children, the propensity to have children (fecundity), or delays the age at which women have children.
 - D8. Women in urban areas tend to have greater financial stability, which reduces the probability of having children, the propensity to have children (fecundity), or delays the age at which women have children.
 - D9. The higher level of access to health care in cities reduces infant and/or child mortality rates, which reduces the need for families to have additional children.
 - D10. People in rural areas may lack access to or may not be able to afford contraception and family planning due to increased levels of poverty, or lack of health services.
 - D11. People in rural areas may hold on to traditional cultural values that do not support limiting birth rates, resulting in higher rates of natural increase in rural areas.
 - D12. People in rural areas may need more children to work or help with labor-intensive agricultural work, resulting in higher rates of natural increase in rural areas.
 - D13. Women in rural areas may lack access to or may not be able to afford education, limiting opportunities outside the home, and resulting in higher rates of natural increase.
 - D14. Women in rural areas may have less access to health care which may increase infant mortality rates and/or child mortality rates, and/or increase the need or desire for families to have additional children.
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| (E) | Explain why there are often differences in doubling times between less developed countries and more developed countries. | 1 point |
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Accept one of the following:

- E1. Doubling times may vary because less developed countries (LDCs) have higher rates of natural increase than more developed countries (MDCs).
 - E2. Doubling times may vary because MDCs have lower rates of natural increase than LDCs.
 - E3. LDCs have social or economic conditions that may result in high population growth rates or high fertility rates (e.g., domestic role of women in society, low age of marriage, highly agricultural society, high levels of religious adherence, and/or high infant mortality rates, low availability of healthcare and/or family planning) that reduce the amount of time needed for a population to double in size, as compared to many MDCs, which do not have these social or economic conditions.
 - E4. MDCs have social and economic conditions that can result in low population growth rates and/or low fertility rates (e.g., equitable roles of women in society, marriage at a later age, service and technology-based economy, highly urbanized society, low levels of religious adherence, and/or low infant mortality rates, high accessibility to healthcare and/or family planning) that increase the amount of time needed for a population to double in size, as compared to many LDCs where these social and economic conditions do not exist.
 - E5. MDCs tend to have lower birth rates or lower total fertility rates than LDCs, which, combined with low death rates and/or a lower RNI, result in a longer doubling time in MDCs.
 - E6. LDCs tend to have higher RNIs than MDCs, resulting in a shorter doubling time in LDCs.
 - E7. LDCs tend to have higher birth rates or higher fertility rates than MDCs, which, combined with lower death rates and/or a higher RNI, result in a shorter doubling time in LDCs.
 - E8. MDCs tend to have lower RNI than LDCs, resulting in a longer doubling time in MDCs.
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| (F) | Explain ONE reason ethnonationalism might lead a government to promote pronatalist policies. | 1 point |
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Accept one of the following:

- F1. A government might promote pronatalist policies because children can be seen as a symbol of national pride and/or a centripetal force (cultural cohesion).
 - F2. A government might promote pronatalist policies because increases in population of a national, ethnic, culture group, or nation-state can improve social cohesion or social relations.
 - F3. A government might promote pronatalist policies because increased birth rates can bolster the desire for territorial expansion, economic growth, irredentism, or militancy (e.g., increased size of the military, social status gained through military service).
 - F4. The government of a theocratic state might promote pronatalist policies based on religious doctrine.
 - F5. Some governments may promote pronatalist policies aimed at the majority (e.g., dominant) culture (e.g., ethnic) group to increase the political power of the majority and/or decrease the power of minority groups.
 - F6. A government with restrictive immigration laws or policies may promote pronatalist policies to reverse a declining total population.
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Question 2: One Stimulus**7 points**

(A) Describe the concept of an early hearth of domestication.**1 point**

Accept one of the following:

- A1. A location where new practices develop and/or from which new practices spread.
- A2. A location where a particular type of plant or animal was first domesticated.
- A3. Locations where early civilizations domesticated plants or animals (e.g., Fertile Crescent, Indus River Valley, Southeast Asia, China, Andean Highlands, Amazonia, and/or Central America).
- A4. An ancient civilization whose farmers converted wild plants or animals into farmable and/or domesticated varieties over time.
- A5. A region (e.g., river valley) where a common wild plant or animal was cultivated into a farmable variant through selective breeding.

(B) Identify the crop listed in the table that has diffused the least from its hearth of domestication to the countries listed in the table.**1 point**

Accept the following:

- B1. Yams diffused the least.

(C) Explain how food preferences can be a culture trait.**1 point**

Accept one of the following:

- C1. Many foods have distinct characteristics (e.g., ingredients, preparations) that are indicative of a specific culture group.
 - C2. Many culture groups identify with one or more national dishes that represent the typical food culture of a society.
 - C3. Many foods contain an ingredient or crop that is local to the region inhabited by a culture group.
 - C4. Many foods are part of a way of life, and/or are forbidden for a group of people, as represented in the belief systems, religion, tools, material goods (artifacts), calendars, and/or holidays of a culture.
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| (F) | Explain why a crop may be farmed intensively in a less developed country and be farmed extensively in a more developed country. | 1 point |
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Accept one of the following:

- F1. Subsistence or intensive farming of a staple crop in less developed countries may be done on small farm plots used to feed a household, whereas extensive or commercial farming in more developed countries would be practiced on large farms for a company's consumers.
- F2. Some farming of staple crops in less developed countries is based on intensive manual labor (e.g., using hand tools, animal power), whereas most farming in more developed countries is mechanized and/or uses limited human or animal labor inputs and is extensive.
- F3. Farmers in less developed countries may not be able to afford or have access to the investment capital, labor-saving equipment, seed supplies, and/or agricultural chemicals needed for extensive farm production, and thus use intensive human labor, whereas farmers in more developed countries tend to have financial resources for investments in extensive farming inputs.
- F4. Many farms in less developed countries use available local resources to feed families or local communities, whereas farms in more developed countries take advantage of economies of scale to produce for large populations.

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| (G) | Explain ONE way the global supply chain links crops such as those listed in the table to consumers in other countries. | 1 point |
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Accept one of the following:

- G1. Crops are transported internationally to consumers, with one of the following steps: storing, processing, packaging, wholesaling, and/or retailing.
- G2. Crop use in the global restaurant and fast-food industries, crops are cultivated and/or processed in one country and are then distributed through supply chains to local restaurants and/or chain restaurants for cooking in another country.
- G3. Due to the increased global consumption of frozen foods, dried foods, canned foods, and/or dehydrated foods, crops can be cultivated and processed into different preserved forms and then distributed to other countries for long-term storage by wholesalers, grocery stores, household consumers, and/or in restaurants until needed for cooking.
- G4. Crops are sent to facilities that process them into other forms (e.g., corn for ethanol, animal feed) which are shipped to wholesalers, retailers, and/or sold to consumers in other countries.

Total for question 2: 7 points

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| (C) | Explain ONE way education infrastructure affects a region’s potential for high-technology development. | 1 point |
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Accept one of the following:

- C1. Graduates of educational institutions, who remain in the region throughout their careers, can promote regional economic development, create innovative products or services, and/or create a source of wealth for investment in the region’s high-technology businesses.
- C2. Educational institutions can develop a labor force with specialized capabilities that make an area better suited to attract high-technology businesses and/or investors from outside of the region to open new facilities and/or move existing facilities or headquarters into the region.
- C3. Educational institutions can sponsor research for new high-technology products and/or services that can be put into production or operation, thus creating new value, investment, and/or employment for the region’s economy.
- C4. Public investment in technical or specialized worker training, businesses, infrastructure, and/or equipment may divert funds away from investment in other community and social programs that support economic development.
- C5. Lack of educational infrastructure can negatively affect a region’s potential for high-technology development because there may not be a highly educated workforce, a specialized labor force, and/or sponsored research for high-technology products or services.

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| (D) | Explain how the pattern shown on the map resembles the galactic city model. | 1 point |
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Accept one of the following:

- D1. The region has multiple development centers (e.g., edge cities, central business districts [CBDs], suburban CBDs), which are based on a specialized product or service.
 - D2. The pattern of business development is decentralized or spread across the region in different locations.
 - D3. The region has a circumferential, circular belt, or radial highway pattern associated with a galactic city’s transportation landscape.
 - D4. The region contains several highway intersections that serve as nodes for new business districts, central business districts, or development centers.
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| (E) | Explain ONE way local economic changes may be a result of deindustrialization. | 1 point |
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Accept one of the following:

- E1. Deindustrialization may cause the local economy to shift from a manufacturing or industry-based economy (secondary sector) to a service and/or technology-based economy (tertiary, quaternary, or quinary sector).
 - E2. Outsourcing of manufacturing or industrial jobs to other countries can lead to a decline in local employment levels and/or an increase in the percentage of the workforce that is unemployed or receiving unemployment benefits.
 - E3. Increased unemployment in the central business district (CBD), declining investment, and/or declining real estate values may result from the loss of manufacturing firms, jobs, and/or services that were once supported by the former industrial economy.
 - E4. Increases in the local use of post-Fordist methods of production (e.g., highly specialized firms, just-in-time delivery supply chains, flexible production methods) by manufacturing firms can indicate a response to deindustrialization to make industrial production more efficient.
 - E5. Gross national income (GNI) per capita in the area may decrease as local people lose employment in manufacturing and/or are unable to find similar-paying jobs in another economic sector.
 - E6. Unemployment rates or underemployment may increase as local people lose employment in manufacturing and/or are unable to find similar-paying jobs in another economic sector.
 - E7. Cities and communities may see decreased tax revenues due to higher unemployment and/or a decrease in population as people move away to search for jobs elsewhere (e.g., backwash effects, migration).
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