令和2年度特色入試問題

《農学部 食料・環境経済学科》

小論文試験

200点満点

(注 意)

1. 問題冊子および解答冊子は係員の指示があるまで開かないこと。
2. 問題冊子は表紙のほかに9ページある。
3. 解答冊子は表紙のほかに10ページある。
4. 試験開始後，解答冊子の表紙所定欄に受験番号・氏名をはっきり記入すること。
   表紙には，これら以外のことを書いてはならない。
5. 解答はすべて解答冊子の指定された箇所に記入すること。
6. 解答に関係のないことを書いた答案は無効にすることがある。
7. 解答冊子は，どのページも切り離してはならない。
8. 問題冊子は持ち帰ること。解答冊子は持ち帰ってはならない。
9. 解答は日本語で記入すること。

1 以下の英文を読んで問１～問４に答えなさい。（100 点）

Did the 1930s and the 1940s mark a major discontinuity in the history of agriculture in Western Europe? If so, what caused the discontinuity? Was it the impact of World War II, or rather of the Great Depression[*1]? And, even more importantly, how much did it matter? To address these issues, this paper starts by comparing the effects of World War II with those of World War I on agricultural production and finds them to be fairly similar in the short run.

In Table 1, the figures refer to the number of years between the first full year of peace (that is, 1919 and 1946) and the return of output to pre-war levels (1913 or 1938) for the first time. For instance, Belgian agriculture attained its 1913 production in 1925 (1919 + 6). One can sum up the results of this short run analysis in three stylized facts:

1. War did affect European agriculture quite badly.
2. Production recovered in few years after both wars.
3. As a whole, the differences between the two wars are small and well within the likely margins of error in estimates.

Table 1: Number of years to return to pre-war gross output

	World War I	World War II
Belgium	+6	+3
Denmark	+2	+3
Finland	+1	+3
France	+3	+4
Germany	+9	+4
Italy	+4	+5
Netherlands	+2	+3
United Kingdom	+4	0

It is possible to compare the actual change in agricultural output with an extrapolation[*2] over the whole period to 1990 of the rate of growth which had been achieved from 1870 to 1913 (1.1 per cent per annum[*3]). The exercise (Figure 1) highlights three stylized facts:

1. European agriculture recovered quite quickly from the war-related shock(s). Its output was back on the pre-war growth path in 1929—that is, nine years after the

end of World War I—and again in 1953—that is, seven years after the end of the World War II.

2. The Great Depression had no impact whatsoever[*4]. Since 1929, agricultural output went on growing as fast as before the war, with some fluctuations[*5] in all likelihood[*6] related to weather. In 1938, actual production was only 0.7 per cent lower than the forecast.
3. The 1950s marked a major discontinuity. The actual production started to diverge[*7] from the projected one in the second half of the decade and by the mid-1980s the gap was as large as 40 per cent.

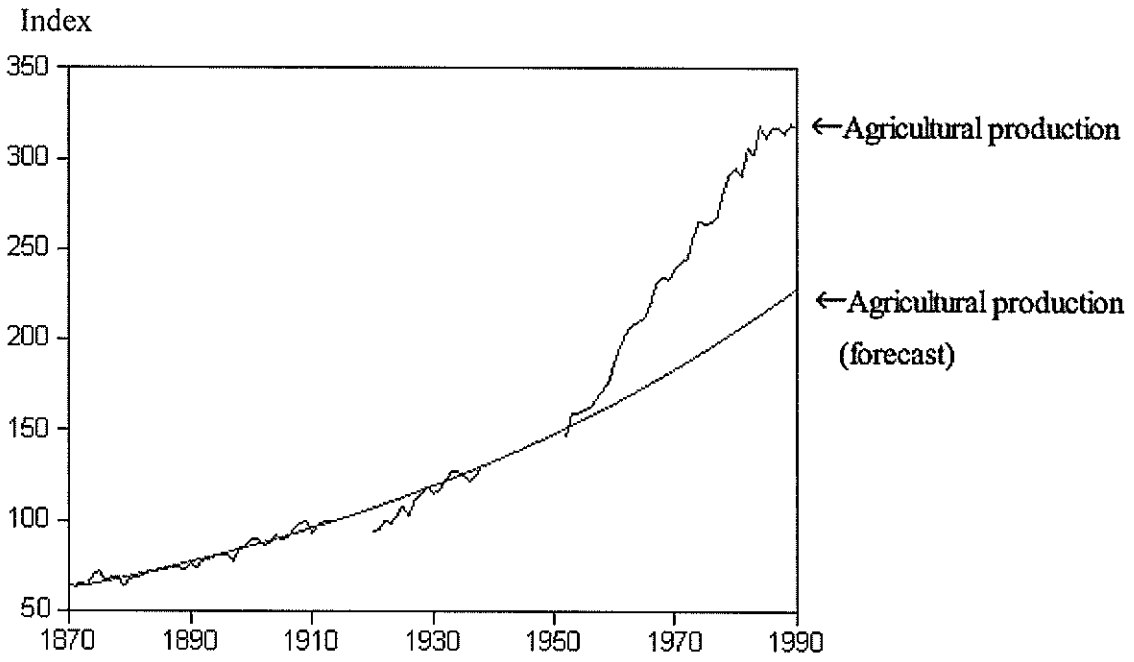

Figure 1: Long-term trends in agricultural production, 1870-1990

Replicating[*8] the counterfactual[*9] exercise with total gross domestic product (GDP; Figure 2) shows ①some interesting differences between agriculture and the rest of the economy.

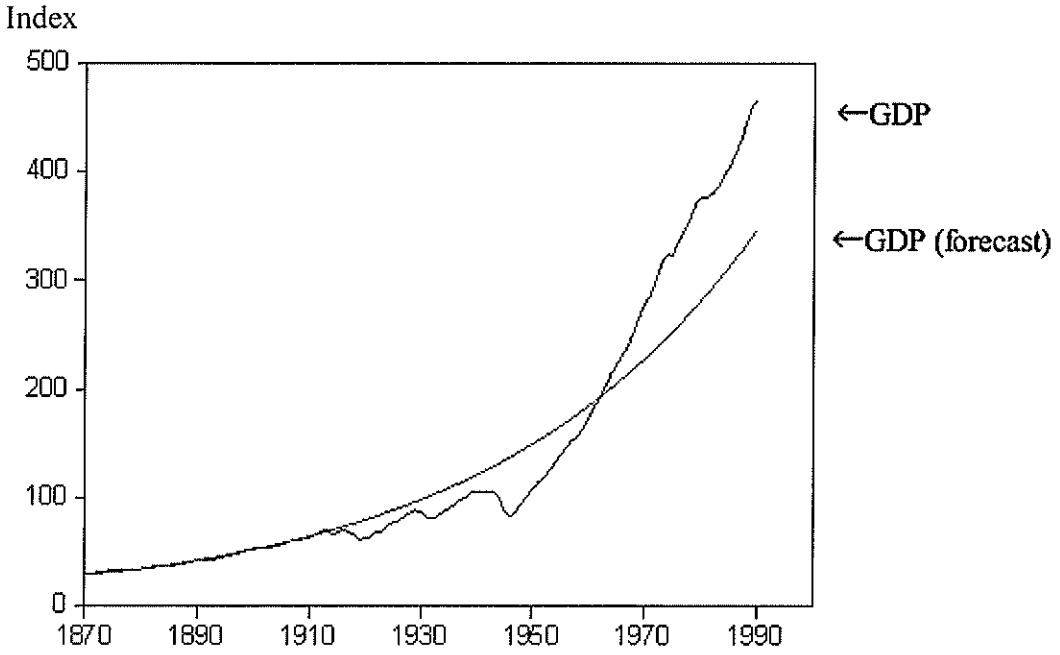

Figure 2: Long-term trends in GDP, 1870-1990

In short, ②the long-run analysis confirms the results of the short-term one for World War I, but not for World War II. The effects of the former were quickly absorbed, while the latter marked a clear discontinuity from the previous trends.

The situation changed with the start of the Great Depression. In a competitive sector such as agriculture, the fall in aggregate demand[*10] caused a collapse in prices, which in oligopolistic[*11] industries prices were maintained by cuts in output. The government tried to prevent a disastrous fall in farmers' income by raising duties well beyond the pre-war levels. However, this measure was deemed insufficient to stave off[*12] the threat of imports from overseas countries. Thus, all countries adopted, for the first time in peacetime, also quantitative controls. At the outbreak of World War II, markets for agricultural products were regulated in all major European countries. After the end of the war, the intervention was partially scaled down, but apparently no one questioned the maintenance of an interventionist agricultural policy. Farmers were widely regarded as deserving support because they were poorer than workers in the rest of the economy and less capable of withstanding overseas competition. Furthermore, ③ food self-sufficiency was still considered essential in most European countries, for a mixture of economic and political reasons.

The previous sections have argued that the years around World War II did mark a major discontinuity, whose origins can be, at least in part, traced back to the policies

hastily adopt to help farmers survive the Great Depression. The legacy of the 1930s haunted European agricultural policies for a long period and arguably it is not yet over. How can this legacy be assessed? ④The results of a well-known paper by Temin*13 point to a negative answer. He finds a negative relation between the rate of growth in GDP during the golden age*14 and the share of agricultural population at the beginning of the period. The higher the share was, the faster the transfer of manpower from low-productivity sectors (such as agriculture) to high-productivity ones (for example, manufacturing) and thus the growth of economy-wide productivity could be. However, this mechanism implies the existence of a disequilibrium*15 in the labour market—that is, of an excess of manpower in agriculture (and a parallel shortage of workforce in the rest of the economy). Temin argues that this excess had been created by the agricultural policies of the 1930s and 1940s. The support to farmers' welfare in the 1950s and 1960s perpetuated*16 this situation by keeping afloat*17 marginal farms which otherwise would have been abandoned or merged with bigger units. Thus, it reduced the growth rate of the European economy relative to its potential. On the other hand, ⑤one can argue that slowing down the transfer of workers out of agriculture, although economically damaging, did prevent social and political turmoil*18.

（出典：Giovanni Federico, 2012, "Natura Non Fecit Saltus: The 1930s as the Discontinuity in the History of European Agriculture," in Paul Brassley et al. (eds.) *War, Agriculture, and Food: Rural Europe from the 1930s to the 1950s*, Routledge, pp.15-32 を一部改変。）

（語注）*1 Great Depression：（1929 年に始まる）世界大恐慌，*2 extrapolation：既知のデータに基づく推定，*3 per annum：1 年あたり，*4 whatsoever：whatever の強意語，*5 fluctuation：変動，*6 in all likelihood：おそらく、十中八九，*7 diverge：それる、はずれる，*8 replicate：反復する，*9 counterfactual：事実と異なる，*10 aggregate demand：総需要，*11 oligopolistic：寡占的な，*12 stave off：阻止する，*13 Temin：Peter Temin（ヨーロッパ経済史研究者の名前），*14 golden age：ここでは第２次世界大戦後のヨーロッパにおける経済成長期のこと，*15 disequilibrium：不均衡，*16 perpetuate：永続させる，*17 keep afloat：破産しないでいる，*18 turmoil：混乱

問１　下線部①の“some interesting differences”について、Figure 1 と Figure 2 を比較しつつ具体的に説明しなさい。なお Figure 1 で、Agricultural production のデータが欠損している期間については、本文中の記述から判断すること。

問２　下線部②について、以下の問に答えなさい。

(1) 第１次世界大戦がヨーロッパの農業生産に与えた影響について、図表を参照しつつ具体的に説明しなさい。

(2) 第２次世界大戦がヨーロッパの農業生産に与えた影響について、図表を参照しつつ具体的に説明しなさい。

問３　下線部④について、以下の問に答えなさい。

(1) Temin は第２次世界大戦後のヨーロッパにおける経済成長の要因をどのように説明しているか述べなさい。

(2) Temin は第２次世界大戦後のヨーロッパ農業政策が経済成長に与えた影響をどのように説明しているか述べなさい。

問４　下線部⑤に関連して、“food self-sufficiency”（下線部③）をめぐる日本の農業政策について、具体例を挙げつつ自身の考えを述べなさい。

2 以下の英文を読んで問１～問５に答えなさい。（100 点）

①Agricultural Innovation Systems (AIS) are key to improving the economic, environmental and social performance of the agri-food sector. In agriculture as in other sectors, innovation is the main driver of productivity growth. In particular, public expenditures on agricultural research and development (R&D) are estimated to have significant impacts on agricultural total factor productivity*1 growth and competitiveness. At the national level, innovation helps create higher value added and improve competitiveness and economic growth. It also contributes to economic diversification*2. At the farm level, introducing innovation should lead to a better allocation of resources, higher productivity, and thus income. At the same time, some innovations have the potential to help farmers deal with production and income uncertainties (e.g. irrigation, animal medicines, pesticides, improved seeds, and innovative risk management tools).

Innovation in agriculture has been very successful in improving the productivity and quality of agricultural products, but it needs to be continuous to remain competitive. Further innovation is needed to adapt to input and output market developments, and changes in resource quality and availability. Innovation will have a key role to play in helping the agrifood sector produce more nutritious, diverse and abundant food, and provide raw material for non-food use, without depleting*3 natural resources, and adapt to expected changes in natural conditions from climate change. In some regions, the challenge is to adapt agricultural production systems to more difficult natural environments (e.g. due to salinity*4, more frequent drought). Innovation in food industries target changes in food consumption habits linked to higher income, health concerns, higher participation of women in the labour force, and reduction of time available for meals.

Changes in the demand for innovation present both challenges and opportunities for AIS. At the same time, agricultural innovation is broader in scope and more complex in nature than it used to be. While science and technology is still a major component of AIS, innovation also includes institutional and organisational innovation. Agricultural innovation also covers more diverse areas, and has to respond to broader policy objectives. ②AIS increasingly draw on innovations developed for general or other purpose such as Information and Communication Technology (ICT), nanotechnology or biotechnology. As a result, agricultural innovation requires more interactions between diverse actors, from research, education, extension*5, farms, policy makers and regulators, NGOs, consumers and brokers; and between fields of science, and thus more co-ordination.

③A specificity of AIS compared to other innovation systems is that major

innovations on farming techniques such as improved seeds are generated outside farms, by public R&D organisations and upstream industries. Diffusion[*6] of innovation thus often requires intermediary actors such as extension services, to be adopted by farmers. Moreover, in many OECD countries, agricultural policies influence producers' willingness and capacity to invest in innovation, and the choice of production system. As for any innovation, adoption by consumers and society can be an issue. Moreover, agriculture is facing global issues, such as food security and climate change, which require international co-operation.

AIS involve a wide range of actors, who guide, support, create, transfer or adopt innovation, and who advise and inform farmers and the public about innovations. ④ Governments provide strategic guidance, financial support to researchers and advisors in public and private organisations, and research infrastructure. Researchers, private businesses and farmers create innovations. Advisors and other intermediaries (brokers, credit institutions, input suppliers) help diffuse innovation in farms and agri-food firms. Charities and non-governmental organisations (NGOs) play a role in funding innovation, and providing information and advice. Finally, markets and consumers provide signals on demand for innovation and acceptance of supplied innovation. All actors are involved to some extent in the provision of information.

Many policies other than innovation policy *per se*[*7] affect innovation and stimulate the creation and adoption of innovation in both the public and private sectors. They include broader general "framework" policies, including macroeconomic and structural policies, and regulations on environmental or safety standards; sectoral policies and innovation policies.

In the agricultural sector, rural, environmental, land, water and agricultural policies are particularly important for AIS as they influence structural adjustment, natural resources quality and availability, investment capacity, and producers' choices of production systems, including through extension and regulations.

Innovation policy includes investments in public R&D institutions to fund: staff and equipment, as well as projects and programmes; support to private R&D through tax rebates[*8], competitive grants and funding of Public-Private Partnerships; the provision of knowledge infrastructure such as ICT, life science infrastructure (gene banks) and information systems; and regulations regarding Intellectual Property Rights. Government policy also supports the creation and functioning of networks, centres of excellence, and provides platforms for partnerships.

Government involvement in agricultural R&D, education and extension is intended to respond to market failures[*9], due to the public good[*10] nature of some research, the

long lags between creation and adoption, and the fragmentation of various agri-food actors. Agricultural R&D generates new technologies, and agricultural extension and advisory services help farmers adopt them. In many countries, agricultural policy measures also support investment in technology. In addition to strengthening and focusing public R&D to address market and system failures, efforts also aim to encourage the creation and adoption of innovation by the private sector, including through regulations to foster acceptance of innovation in the wider economy (consumer information and food safety regulations), the provision of risk management tools, and incentives for partnerships. This leads to better define the respective public-private roles in innovation, and to better integrate partners in innovation systems.

（出典：OECD, 2013, *Agricultural Innovation Systems: A Framework for Analysing the Role of the Government*, pp.1-17 を一部改変。）

（語注）*1 total factor productivity：全要素生産性、総合生産性，*2 diversification：多様化，*3 deplete：枯渇させる，*4 salinity：塩分，*5 extension：普及，*6 diffusion：拡散，*7 *per se*：それ自体，*8 rebate：割引，*9 market failures：市場の失敗（資源配分様式としての市場機構の欠陥を総称するものであり、市場機構が最適な資源配分を実現しえない状況をさす），*10 public good：公共財（私有制を前提とする個別取引によっては有効に供給されない性質をもち、共同的・集合的な形での消費を前提とせざるをえない財をさす）

問１　下線部①に関して、AIS が農業・食品産業の経済的・環境的パフォーマンスの改善に果たす役割を、具体的に説明しなさい。

問２　下線部③について、このようになる理由を述べなさい。

問３　本文を参考に、下線部④に示した AIS における政府の役割を具体的に説明しなさい。

問４　ある農家が土地（x_1：ヘクタール）と労働（x_2：人）を用いて、農作物を生産するとする（x_1，x_2はそれぞれ土地、労働の投入量を表す)。農作物の生産量（q：トン）と土地・労働の投入量との間には次式が成立するものと仮定する。

$$q = 30\sqrt[3]{x_1 x_2}$$

農産物、土地、労働の価格をそれぞれ 1 ドル/トン、3 ドル/ヘクタール、5 ドル/人とした場合、農家の利潤（y：ドル）は次式のように表せる。

$$y = q - (3x_1 + 5x_2)$$

(1)　土地の投入量が 8 ヘクタールに固定されている場合、農家の利潤が最大となる労働の投入量と農産物の生産量および最大利潤を求めなさい。

(2)　農家が土地の投入量を自由に選択できる場合、農家の利潤が最大となる土地の投入量と労働の投入量および農産物の生産量と最大利潤を求めなさい。

問５　日本農業の現状に即して、下線部②に示したような AIS が実際の農業問題の解消に果たしうる役割や期待される効果を、実例を挙げて説明しなさい。