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### Summary

Carbon dioxide (CO<sub>2</sub>) is a well-known “greenhouse gas” that is capable of causing significant climatic change. The optimum ranges of grass species will likely shift as a result of climatic change. Accordingly, the optimum range of each species needs to be determined in order to select grass species that will grow in the expected new vegetation zones. Changes in cultivation zones and the productivity of forage grass cultivation in Japan were estimated.

Global climate change will increase the annual mean temperature by about 4.5°C in northern Japan and 3.5°C in southern Japan. Maps were drawn showing current and future temperate grass zones, tropical grass zones, and summer depression zones, where tropical grass cannot survive in winter and the productivity of temperate grass is depressed in summer. These maps show that under present climatic conditions, the summer depression zone of temperate grasses and the cultivation zone of tropical grasses are limited to southwestern Japan. Over the next 100 years, these zones will extend northwards.

Changes in the area and productivity of real pasture were calculated and summed by prefecture for Japan. The summer depression area will increase by over 50%. The productivity of temperate and tropical grasses will increase 40 and 360%, respectively, for an overall grass productivity increase in Japan of 50%.

Keywords: Global climate change, Cultivation zone, Temperate grass, Tropical grass, Productivity

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