Concept Paper: International Collaborative Partnership to Scale Up and Out Climate-smart Technologies through Social Experiment-like Approaches (draft)

Ⅰ Introduction

Agriculture is a sector vulnerable to climate change, and recently, drought and flood has become a great threat to food production. At the same time, it is a significant emission source; AFOLU (agriculture, forestry and other land uses) sector is responsible for about 1/4 of global anthropogenic greenhouse gas (GHG) emission. However, with development and implementation of innovative agricultural technologies, GHG emission could be reduced and simultaneously food production sustained.

At the next G20 Meeting of Agricultural Chief Scientists (MACS) in 2019, Japan will propose to discuss this topic, to organize a workshop to share country experiences, and advance "scaling up and out" to maximize the effect of climate-smart technologies through a social experiment-like approach.

Ⅱ Background and challenges

1. International situation regarding agriculture and climate change

According to the Food and Agriculture Organization (FAO), climate variability and extremes are among the key drivers of global hunger and undernourishment. With regard to international movements concerning agriculture and climate change, an international initiative "4 per 1000" was launched by French leadership, at COP 21 of the UN Framework Convention on Climate Change (UNFCCC) in 2015. Technical discussions on soil carbon sequestration are also undertaken by G20 member countries in other fora, including the soil carbon sequestration flagship project in the Global Research Alliance on Agricultural Greenhouse Gases (GRA). At COP 23 in 2017, the Koronivia joint work on agriculture was adopted, and workshops on topics including improved soil carbon under grasslands and croplands, improved nutrient use and livestock management have been initiated. Further, at G20 MACS held in May 2018, a working group for research cooperation on sustainable soil management was proposed by France and Russia and is expected to promote research collaboration in this area.

2. Situation regarding climate change related technologies and on-site adoption

In order to adapt to climate change, impact assessment on agriculture has been promoted, and new varieties and management practices to adapt to high temperature and drought are being developed. Pilot projects have been conducted to introduce weather index insurance and other insurance schemes to help protecting farmers' income loss in case of weather extremes. Meanwhile, development of mitigation technologies such as soil carbon sequestration technologies/practices, livestock and crop management technologies to reduce N_2O and/or CH_4 has progressed, and methods to promote adoption of those technologies, including emission trading, environmental direct payment by government and labeling of carbon foot print are also being promoted. At G20 MACS in May 2018, it was agreed to support "agroecosystem living labs" (ALL) approach, and the USA and Canada have led the working group to promote research collaboration on these

approaches. Policy makers, extension officers, scientists and development practitioners often find it difficult to introduce new technologies to farmers because there are various obstacles and challenges for farmers to change their practices. The ALL approach addresses these challenges by co-developing technologies and solutions with end users using a transdisciplinary approach in working landscapes. In this way, scaling up and adoption of new climate-smart technologies can be accelerated leading to greater resilience and agri-environmental performance.

3. Approaches for scaling up and out climate change technologies

In order to scale up and out climate change technologies, it is important that research institutes possessing technologies, in collaboration with research institutes of the countries/regions in which those technologies are to be introduced, conduct on-site pilot projects and adapt the practices and technologies to optimize performance in the target area. In particular, mitigation technologies often need to be introduced in combination with some kind of incentive to facilitate their adoption. Therefore, it is effective to introduce technologies through social experiment-like approaches by collaboration between natural and social science and through international partnership. Education should be considered as a powerful means of spreading innovative practices and technologies, especially through young farmers.

Ⅲ Proposed actions for international research collaboration at G20 MACS 2019

1. Interested G20 members should share their experiences in development and scaling up and out of technologies including on monitoring climate change; impact assessment; development of new varieties and management practices for adaptation; reducing GHG emission; and enhancing sequestration. To this end, Japan proposes to organize an international workshop later in 2019.

2. Interested G20 members should identify suitable adaptation and/or mitigation technologies for scaling up and out, and strengthen research collaboration with countries which are in need of and interested in introduction of these technologies. In promoting pilot projects in a social experiment-like approach, it is important to consider the target technology(ies) and introduction method in accordance with respective local conditions, and co-develop approaches with end users to accelerate their adoption as well as to optimize the technology(ies) to best suit the target region through improvement of the target technology(ies) based on the results of the pilot.

3. Interested G20 members should strengthen collaboration with relevant international organizations such as GRA, Consultative Group on International Agricultural Research, FAO, UNFCCC, Intergovernmental Panel on Climate Change and the World Bank in order to make their own activities complementary to those of these international organizations. It is useful to invite their participation in the activities mentioned in 1. and 2. above when necessary.