Station Note

World Café at TD 1.3

Station 6: Local farmer or other food producer

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Agriculture is very sensitive to weather and climate, and it relies heavily on land, water, and other natural resources, which are similarly affected by the climate. Climate changes (e.g., in temperature, precipitation, and frost timing) could bring potential benefits to some regions by, for example, lengthening the growing season or allowing new crops to be harvested, but in others, it may also reduce the productivity of agricultural systems. While many farmers have long adapted to natural variations in weather patterns, climate change is posing new challenges to them, and at the farm level, building resilience to intensifying climate impacts is requiring faster changes in agricultural practices than anticipated. For fishers, climate change is shifting the geographic distribution of key species, as well as spurring range contraction, expansion, or fragmentation. As a result, fishers and fishing communities may no longer be able to access the species they are accustomed to fishing.

At the same time, shifting agricultural practices can also help mitigate climate change by reducing GHG emissions and increasing carbon sequestration. Thus, farmers and fishers around the world now face the unique challenge of tailoring practices that can deliver both mitigation and adaptation benefits to their specific contexts. For example, the ability to respond to climate impacts and contribute to mitigation varies across contexts, and can be quite different for large and small-scale farmers.

Possible Scenarios[i]:

Scenario 1. Vineyards and wineries in a Mediterranean climate.
The Mediterranean Biomes will experience faster-than-average rises in temperature and may suffer major losses of rainfall in future decades. Viticulturists are among those already feeling these effects of climate change. One particularly harmful impact is that higher temperatures make grapes ripen too early and before their aromas have had a chance to fully develop. Consequently, viticulturists need to make strategic decisions about how to adapt to these climate impacts. At the same time, farming techniques, such as the application of organic soil conditioners or the use of ground cover (natural or sown), can also help enhance carbon sequestration in the soil, thereby contributing to climate change mitigation efforts.

<u>Possible actions that farmers are considering based on their experience and what we are told by experts:</u>

- Increasing access to more tailored forecasts (e.g., temperatures and rainfall patterns) to better estimate when vines will produce buds or grapes will ripen.
- Adopting pruning techniques to help vineyards adapt to climate change, such as pruning vines so the grapes mature later in the growing season once temperatures have dropped.
- Testing more resilient grape varieties, including those that can withstand higher temperatures and dryer conditions.

- Identifying plots of land in cooler locations (e.g., more northern or more elevated) to plant future grapes.
- Applying organic soil conditioners, using ground cover (natural or sown), and incorporating winter pruning and green pruning trimmings into the soil to increase the soil's capacity to hold water, feed the vines, and increase carbon sequestration.
- Advancing innovations in wine-making that increase circularity, such as storing the CO_2 released during the fermentation process in a tank to reuse later as an inert gas for filling the tanks with wine.

Scenario 2. Rice cultivation a changing climate, with a focus on Asia.

Across Asia, in particular, there has been very little expansion of the area under rice cultivation, while the productivity per hectare (ha) has increased. In general, the average size of farms decreased to about two ha, and the average age of farmers increased. The region has also witnessed an average reduction in yields across rainfed, drought-prone areas in severe drought years, leading to substantial production losses.

Possible actions that farmers are considering based on their experience and what we are told by experts:

- Implementing alternate wetting and drying water management to cut methane and nitrous oxide emissions.
- Improving irrigation water delivery and land leveling.
- Using improved seeds (e.g. drought-, pest-, and flood-resistant high yielding varieties).
- Increasing soil testing, combined with improving fertilizer application.

Scenario 3. Extensive livestock production.

The livestock sector creates substantial employment opportunities for rural households, and in developing countries, specifically, livestock represent a major provider of food, nutritional security, livelihoods, and income. Livestock production is driven by a growing population, rising incomes, and urbanization, with the demand for livestock products is increasing rapidly. Yet livestock production is also facing increasing threats from climate change, such as increasing temperatures, more variable precipitation patterns, and more frequent extreme events. Not only does climate change directly impact these animals' health and mortality, but it also affects water supplies needed for livestock, for irrigating feedstock crops, and for maintaining soil moisture in grasslands. Livestock production also contributes to rising GHGs emissions through, for example, enteric fermentation, manure, and land-use changes that make way for rangelands.

Critically, this scenario includes a wide range of livestock producers, from nomadic or semi-nomadic pastoralists in semi-arid and arid lands to ranchers in temperate, semi-tropical and tropical regions.

Possible actions that farmers are considering based on their experience and what we are told by experts:

- Shift to multi-species farming to enhance producers' ability to cope with a changing climate and the associated changes in rangeland conditions.
- Adjust stocking rates to reduce the effects of loses in feed due to drought.
- Integrate livestock systems with forestry or crop systems.
- Improve feed and fodder to reduce methane emissions from enteric fermentation.
- Improve rangeland management and/or restore traditional (or adapted to the new climate conditions) livestock migratory routes.

Scenario 4. Wheat producers experiencing increasing droughts.

Wheat is the most widely cultivated cereal crop and is consumed in many parts of the world. Wheat is classified as either winter wheat or spring wheat, according to the season during which the crop is grown. Winter wheat sprouts before freezing occurs, then becomes dormant until the soil warms in the spring. It also requires a few weeks of cold before flowering. For example, in the Northern hemisphere, normally, it is sowed in October and November and is ready to be harvested by June and July. Spring wheat, on the other hand, is usually planted between March and May and harvested between July and September (note the shorter cycle than winter wheat) in the Northern hemisphere.

Changes in temperature and precipitation, including more extreme weather events, will significantly impact the production of this crop. At the same time, increased use of fertilizers in more intensive farms are contributing to rising GHG emissions. Farmers face the dual challenge, then, of adapting spring and winter wheat production to a changing climate, while also shifting to practices that can help lower releases of GHGs.

Possible actions that farmers are considering based on their experience and what we are told by experts:

- Breed wheat varieties that are more resilient to changes in temperature and droughts.
- Shift to more drought-tolerant cereal grain crops, such as millet.
- Introduce or improve irrigation systems towards greater water-use efficiency, for example, by using a drip-irrigation system.
- Reduce over-use of fertilizer, including through the use of precision fertilizer application.

Scenario 5. Fishing communities in coastal areas.

Climate change is spurring shifts in marine species' distributions, disrupting fishers and fishing communities, as well as threatening food security. In some cases, these climate impacts can prompt the relocation of processing facilities, markets, or fishing vessels. Moving fishing locations, as well as adopting new fishing technologies or changing fishers' behavior, can cause fishers to stop relying on accumulated local or traditional knowledge. This can, in turn, further exacerbate economic and ecological impacts in the communities. International fish markets have been seen as a buffer to these local supply shocks, but reliance on international trade also can have negative effects, such as the loss of domestic products and the vulnerability of jobs.

Possible actions that farmers are considering based on their experience and what we are told by experts:

- Implement strategies that rely on more moderate captures and increased variability, for example, by adapting captures to declines in species abundance and new species occurrences.
- Create and enhance cooperatives, producer organizations, and associations.
- Temporarily shift to other income sources.

Questions to Facilitate Discussions across Scenarios:

1. With this scenario in mind, would you recommend that our farmer, María, prioritize any actions beyond those that she mentioned to further reduce GHG emissions from agricultural production and land-use change and/or adapt to current and future climate impacts?
2. Of these actions we've just listed, would you recommend implementing them in a specific order?
    a. Which ones do you think María can and should implement immediately, and why? And which ones would you advise her to implement over the mid- to long-term, and why?

    b. Based on this sequencing, what concrete and immediate next steps would you advise this farmer to take?
3. What challenges do you think María will face in implementing these actions? And what can she do to overcome these obstacles?
    a. What information are her information needs?
4. Finally, what can others do to support (e.g., create enabling conditions for) María in reducing GHG emissions and building resilience? Are there supportive actions that a broader set of actors, e.g., governments, civil society organizations, businesses, and/or financial institutions, can undertake now to support *immediate* change?
    a. And what actions can be pursued now that will spur changes over the mid- to later term?

[i] The actions indicated under each scenario that farmers are doing or can do are not aimed to be comprehensive, but rather examples.