Questionnaire in relation to Human Rights Council resolution 50/9 on human rights and climate change

1. **Please describe through concrete examples and stories how climate change is affecting the full realization of the right to adequate food in your country:**

Response by the Department of Agriculture and Agrifood Brunei, Ministry of Primary Resources and Tourism:

Climate change effects include abnormal patterns of rainfall occurrences that can cause flash floods. In Brunei, these flash floods affect primarily the low-lying areas and badly impacts farmers that are actively growing crops, primarily vegetables, in a conventional method (beds or raised beds). These types of crops will not be able to withstand flash floods and the farmers will experience heavy losses to production. In terms of food security, fortunately this is still not a major problem as rice plants are still able to withstand flooding for a specific number of days.

Response by the Faculty of Agriculture, Universiti Islam Sultan Sharif Ali:

Intense rainfall can also be seen in recent times in some parts of the country such as the Tutong District of Brunei Darussalam which has been characterized by intermittent flooding. This disrupts farming activities in some farming communities. It is anticipated that such precipitations may cause inflows of water to inundate the coastal communities and this affects their livelihood through, for example, soil salinization and sodification. Alterations in such soil chemistry could negatively affect existing soil and crop productivity, particularly paddy and vegetables. Intense rainfall in the areas whose mineral soils (Highly weathered soils) are acidic may further lose base cations (Calcium, magnesium, potassium, and sodium) and soil organic matter through for example leaching, runoff, and soil erosion.

The loss of base cations will be replaced by for example, acidic cations such as aluminium and iron, which weather from the soils' parent materials such as rocks and minerals, to undergo hydrolysis. This chemical reaction ends up releasing more hydrogen ions to further increase existing soil acidity. Moreover, the continued accumulation of the acidic cations are toxic to plants. Their accumulation disrupts or kills plant roots, thus resulting in poor plant growth and development. Furthermore, the afore-stated soil reactions are likely to negatively disrupt the productivity of aquatic life particularly aquaculture.

3. **Please describe any specific measures, including public policies, legislation, practices or strategies that your government has undertaken, in compliance with applicable international human rights law, to promote an approach to climate change mitigation and adaptation, as well as loss and damage that ensures the full and**

effective enjoyment of the right to food. Please also note and identify any relevant mechanisms for ensuring accountability for these commitments including their means of implementation.

Response by the Faculty of Agriculture, Universiti Islam Sultan Sharif Ali:

Among the important measures put in place are the newly established Faculty of Agriculture and Ibnu Sina Scientific Laboratory Centre at the Universiti Islam Sultan Sharif Ali (UNISSA), Brunei Darussalam is currently partnering/collaborating with relevant public agencies (Brunei Darussalam Department of Agriculture and Agrifood, Brunei Climate Change Secretariat, Brunei Darussalam Meteorological Department, Brunei Darussalam Department of Fisheries, Universities, etc.) and private sectors (Farming communities and aquaculture and livestock industries etc.) to champion the cause of achieving food security in Brunei Darussalam.

In all these collaborations, there are set short, medium and long-term goals and key performing indicators for monitoring and evaluating progress of implementation so as to ensure accurate accountability. For example, in conjunction with the Department of Agriculture and Agrifood (Soil and Crop Unit), Brunei Darussalam and selected paddy growing farmers, the expertise of the Faculty of Agriculture is being extended to farmers through deployment of nature inspired innovations to boost the agronomic, socio-economic, and environmental efficiency of the farmers.

To ensure sustainable transfer of new methods and technologies related to agriculture and aquaculture *vis a vis* food security, the Faculty of Agriculture and Ibnu Sina Scientific Laboratory Centre (UNISSA) are engaging in cutting edge research and development with expected outcomes which can be practically translated or transferred to the agriculture and food industries. Besides engaging in research and professional services, one of the core mandates of the Faculty of Agriculture (UNISSA) is its commitments to capacity building or human capital contribution through for example, running Agribusiness and Agriculture Technology programmes at graduate and postgraduate levels. For medium- and long-term goals, the faculty will be running Aquaculture, Horticulture, Animal Husbandry, and Veterinary Science programmes at graduate and postgraduate levels.

4. **Please describe any mechanisms and tools that are in place to measure and monitor the impact of climate change on the full realization the right to food.**

Response by the Faculty of Agriculture, Universiti Islam Sultan Sharif Ali:

Out of the 17 sustainable development goals, 12 are on agriculture and eight are on soils. No wonder the current Director-General of the Food and Agriculture

Organization made this profound statement “Soil is the mother of agriculture, the mother of life”. To buttress the significance or importance of this statement is the World Soil Day 2022 theme “Soil: Where food begins”. It is also believed that should there any average increase in the world’s atmospheric temperature by 2 ^{O}C or 2.5 ^{O}C, land temperature will increase by approximately 8 ^{O}C to 10 ^{O}C (Approximately four to five folds the atmospheric temperature).

To this end, in collaboration with the Faculty of Agriculture (UNISSA), Department of Agriculture (Soil and Crop Unit, Brunei Darussalam), Brunei Climate Change Secretariat, Brunei Darussalam Meteorological Department, Department of Fisheries, Brunei Darussalam, Universiti Teknologi Brunei, and Brunei Darussalam farming communities, the physical, chemical, and biological properties of selected soil in relation to climate change will be measured and monitored to ensure that climate smart practices such as regenerative agriculture, precision farming/smart farming are put in place. Regenerative agriculture involving conservation agriculture, integrated farming, site specific management agriculture, soil health restoration, and carbon farming are among the short, medium and long-term research projects *vis a vis* climate change and climate change adaption farming systems.

5. Please identify and share examples of promising practices and challenges in the promotion, protection, and fulfilment of the full realization of the right to food in the context of the adverse effects of climate change.

Response by the Department of Agriculture and Agrifood Brunei, Ministry of Primary Resources and Tourism:

An initiative by the Department of Agriculture and Agrifood is to introduce raised benching systems in addition to fertigation planting systems. Fertigation in greenhouses is considered modern techniques of growing crops but low lying-areas prone to flooding can still cause damages to the fertigation polybags. Therefore, an initiative was introduced to the farmers to invest in benching/raised benching system since 2021. However, farmers are reluctant to adopt the practice as it may increase their cost of production, despite heavy losses from the flash floods.

Response by the Faculty of Agriculture, Universiti Islam Sultan Sharif Ali:

The Faculty of Agriculture under the Universiti Islam Sultan Sharif Ali details the following activities being embarked on in response to promising practices and challenges in the realization of the right to food:

(i) Transformation of agro-wastes into soil organic amendments to improve soil, crop, socio-economic, and environmental efficiency. This aims not only to

contribute to achieving food security but to also reduce the greenhouse effect (Methane, carbon dioxide, and nitrous oxide) which has been implicated in agriculture.

(ii) Circular farming as one of the climate-smart agriculture. For example, there are three research projects being embarked as translational research. The topics are: (1) Organic approach for restoring phosphorus availability to improve acid soil and crop productivity in Brunei Darussalam, (2) Improving soil and crop productivity using organic bio-fertilizers produced from food wastes for sustainable agriculture in Brunei Darussalam, and (3) Transforming chicken litter into superior soil conditioner to improve phosphorus availability and crop yield.

(iii) Production of climate resilient crop varieties, particularly rice.

(iv) Production of bio-fertilizers from food wastes to facilitate organic farming in Brunei Darussalam and beyond.

(v) Production of fish feed from agro-wastes such as coffee.

(vi) Support knowledge transfer to farming communities in addition to engaging in industrial linkages.

(vii) Generation from research which are pertinent to achieving sustainable agriculture as one of the means for climate change adaptation strategies.

(viii) Engage in professional services (Advisory services) related to 'Terrestrial Environment (soil, plant, fertilizer) and Aquatic Environment (water quality, fish, and prawn culture) to achieve SDGs 14 and 15.

(ix) Monitoring aquaculture activities to ensure quality food and nutrition to the stakeholders while ensuring that practices are ethical, Halalan Thayyiban, and sustainable.

(x) Climate change implications for fisheries and aquaculture management and their potentials impacts, adaptations, and mitigations in Brunei Darussalam perspectives.

(xi) Herbal pharmacology.

6. Please include examples and promising practices and challenges that highlight international and multilateral cooperation and approaches that promote the full realization of the right too food.

Response by the Faculty of Agriculture, Universiti Islam Sultan Sharif Ali:

At the international and multilateral levels, the Faculty of Agriculture (UNISSA) is the designated country consultant (Paddy and Aquaculture) for the ongoing "Research project on building and enhancing the sustainable agriculture and food system in ASEAN countries" (2022 to 2025). The objectives of this research project are listed as follows:

(i) Identify key priority areas and strategies that should be focused for building and enhancing sustainable agriculture and food systems in each ASEAN country, taking into account national priorities.
(ii) Carry out a comparative analysis on gaps and linkages in terms of priority area and strategies (1) between the reality of each country and the guidelines and (2) among AMS.
(iii) Undertake basic assessment of readiness of AMS in applying the guidelines.

The ongoing collaboration is under the auspices of the ASEAN Regional Guidelines for Sustainable Agriculture in ASEAN – Developing food security and food productivity in ASEAN with sustainable and circular agriculture which was officially endorsed by the Meeting of the ASEAN Ministers on Agriculture and Forestry (AMAF) on 26 October 2022. Project which is being coordinated by the Economic Research Institute for ASEAN and East Asia expects the following research outcomes:

(i) Identification of key priority sustainable issues and strategies of agriculture and food system in each ASEAN country.
(ii) Basic assessment of the readiness of AMS in implementing the guidelines.
(iii) Raw data and information collected by country survey (for future study).