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**Subsidiary Body for Scientific and
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Fifty-first session

Santiago, 2–7 December 2019*

Item X of the provisional agenda

Koronivia joint work on agriculture

Subsidiary Body for Implementation

Fifty-first session

Santiago, 2–7 December 2019*

Item X of the provisional agenda

Koronivia joint work on agriculture

**Methods and approaches for assessing adaptation, adaptation
co-benefits and resilience**

Workshop report by the secretariat

Summary

The workshop on methods and approaches for assessing adaptation, adaptation co-benefits and resilience was held in conjunction with the fiftieth sessions of the subsidiary bodies. Representatives of Parties, constituted bodies under the Convention, United Nations organizations and observer organizations presented their relevant work and experience. The workshop provided a platform for a rich discussion on existing methods and approaches and highlighted possible next steps for advancing progress and promoting greater coherence in assessing adaptation, adaptation co-benefits and resilience at the global, national and project level.

* Session dates are tentative.

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Abbreviations and acronyms

AC	Adaptation Committee
CCAFS	CGIAR Research Program on Climate Change, Agriculture and Food Security
CMA	Conference of the Parties serving as the meeting of the Parties to the Paris Agreement
COP	Conference of the Parties
FAO	Food and Agriculture Organization of the United Nations
GCF	Green Climate Fund
GEF	Global Environment Facility
IPCC	Intergovernmental Panel on Climate Change
KJWA	Koronivia joint work on agriculture
LDCF	Least Developed Countries Fund
LEG	Least Developed Countries Expert Group
NAP	national adaptation plan
NAPA	national adaptation programme of action
NDC	nationally determined contribution
NWP	Nairobi work programme on impacts, vulnerability and adaptation to climate change
SB	sessions of the subsidiary bodies
SBI	Subsidiary Body for Implementation
SBSTA	Subsidiary Body for Scientific and Technological Advice
SCCF	Special Climate Change Fund
SDG	Sustainable Development Goal
UNDRR	United Nations Office for Disaster Risk Reduction

I. Introduction

A. Mandate

1. The COP requested the SBI and the SBSTA to jointly address issues related to agriculture, including through workshops and expert meetings, working with constituted bodies under the Convention and taking into consideration the vulnerabilities of agriculture to climate change and approaches to addressing food security.¹
2. The SBI and the SBSTA requested the secretariat, subject to the availability of supplementary resources, to organize six workshops between December 2018 and June 2020 under the KJWA,² as outlined in the Koronivia road map.³ They encouraged admitted observers to participate in these workshops.
3. The SBI and the SBSTA requested the secretariat to organize the second workshop in conjunction with SB 50 on the subject of methods and approaches for assessing adaptation, adaptation co-benefits and resilience. They also requested the secretariat to prepare a report on the workshop for their consideration at SB 51.⁴ They further requested the secretariat to invite representatives of the constituted bodies to contribute to the work and attend the workshops.⁵
4. The SBI and the SBSTA invited Parties and observers to submit via the submission portal⁶ their views on the subject of the workshop referred to in paragraph 3 above.⁷ They took note of the importance of issues, including but not limited to farmers, gender, youth, local communities and indigenous peoples, and encouraged Parties to take them into consideration when making submissions and during the KJWA workshops.⁸

B. Possible action by the Subsidiary Body for Implementation and the Subsidiary Body for Scientific and Technological Advice

5. The SBI and the SBSTA may wish to consider this report at SB 51 when reviewing the KJWA and preparing a report to COP 26 on the progress and outcomes of that work.

II. Proceedings

6. The workshop referred to in paragraph 3 above was organized by the secretariat and held in Bonn on 17 and 18 June 2019. It was open to all Parties and observers attending SB 50.
7. The Chair of the SBI, Emmanuel Dumisani Dlamini (Eswatini), delivered opening remarks and detailed the mandate and objectives of the workshop. He invited Heikki Granholm (Finland) and Milagros Sandoval (Peru) to co-facilitate the workshop.
8. The workshop was organized in four sessions:
 - (a) Methods and approaches for assessing adaptation and resilience in agriculture;
 - (b) Adaptation co-benefits;
 - (c) Work undertaken by financial entities;

¹ Decision 4/CP.23, para. 1.

² FCCC/SBI/2018/9, para. 39, and FCCC/SBSTA/2018/4, para. 61.

³ FCCC/SBI/2018/9, annex I, and FCCC/SBSTA/2018/4, annex I.

⁴ FCCC/SBI/2018/9, para. 41, and FCCC/SBSTA/2018/4, para. 63.

⁵ FCCC/SBI/2018/9, para. 42, and FCCC/SBSTA/2018/4, para. 64.

⁶ <https://www4.unfccc.int/sites/submissionsstaging/Pages/Home.aspx>.

⁷ FCCC/SBI/2018/9, para. 43, and FCCC/SBSTA/2018/4, para. 65.

⁸ FCCC/SBI/2018/9, para. 40, and FCCC/SBSTA/2018/4, para. 62.

(d) Cross-cutting perspectives of farmers, youth, local communities and indigenous peoples.

9. The first session opened with an overview presentation by a representative of FAO, followed by presentations by representatives of the AC and the LEG. The second session comprised an overview presentation by a representative of the World Bank, and another by CCAFS that was shared with the workshop participants online as a representative was unable to deliver it in person. Party representatives made presentations on the topics of both sessions before a discussion closed the first day of the workshop.

10. On the second day, representatives of Financial Mechanism entities made presentations in the third session, and non-State actor representatives shared their cross-cutting perspectives in the fourth. The day again ended with a discussion.

11. The presentations and discussions addressed methods and approaches for assessing adaptation, adaptation co-benefits and resilience at the project, sector, national and global level. Further information on the workshop, including the agenda and presentations, is available on the UNFCCC website.⁹

III. Summary of presentations

A. Methods and approaches for assessing adaptation and resilience in agriculture

1. Overview presentation by an invited organization

12. A representative of FAO presented on the role of sector-wide assessment in promoting effective adaptation and synergy in the implementation of relevant international agreements (the Paris Agreement, the 2030 Agenda for Sustainable Development and the Sendai Framework for Disaster Risk Reduction 2015–2030). It was highlighted that a long-term approach is required to transform agriculture such that it can effectively respond to climate change impacts, thus warranting continuation of the KJWA beyond 2020 by raising ambition and generating political will to scale up the process.

13. The representative also highlighted the importance of assessing progress towards goals; that is, the global goal on adaptation (with national targets defined in NDCs and NAPs) in the case of the Paris Agreement, the 17 SDGs of the 2030 Agenda for Sustainable Development, and the seven global targets (with flexibility for additional national targets) under the Sendai Framework. Under Article 7, paragraph 9(d), of the Paris Agreement, Parties may develop country-specific adaptation monitoring, evaluation and learning systems. The development of a global monitoring and evaluation framework for the SDGs is coordinated by the Inter-agency and Expert Group on SDG Indicators, while the development of indicators for measuring global progress in implementing the Sendai Framework is led by an open-ended intergovernmental expert working group nominated by countries and supported by UNDRR.

14. An approach to tracking progress towards the goals and targets set under the three international agreements referred to in paragraph 13 above is presented in a recent FAO publication.¹⁰ The 112 indicators presented for monitoring adaptation in the agriculture sector capture the links between adaptation processes and their outcomes, including effects on food security and nutrition. They are based partly on indicators previously defined by FAO, UNDRR and the UNFCCC and are grouped under four categories: natural resources; agricultural production systems; socioeconomics, and institutions and policy. They constitute

⁹ <https://unfccc.int/event/methods-and-approaches-for-assessing-adaptation-adaptation-co-benefits-and-resilience>.

¹⁰ FAO. 2017. *Tracking adaptation in agricultural sectors: Climate change adaptation indicators*. Rome: FAO. Available at <http://www.fao.org/3/a-i8145e.pdf>.

a framework for monitoring at the national and, provided they are customized, local level. The full set of indicators is being tested in Malawi, Mozambique and Zambia. FAO has also developed a guidance document on integrating agriculture into NAPs.¹¹ The guidance includes a seven-step approach to establishing a national monitoring and evaluation framework for agriculture.

15. The representative outlined the need to develop a coherent framework of methods and indicators for tracking, assessing and reporting on progress towards countries' targets in relation to adaptation, adaptation co-benefits and resilience as part of global agendas. It could promote enhanced ambition in NDCs and support reporting on agriculture sectors on the basis of NAPs. FAO is ready to work on such a framework with relevant constituted bodies under the Convention and the Paris Agreement, and international bodies and organizations such as the IPCC and the Organisation for Economic Co-operation and Development.

2. Presentations by constituted bodies

16. A representative of the AC summarized its work in advising on and supporting the assessment, monitoring and evaluation of adaptation at the national level, and in reviewing the adequacy and effectiveness of adaptation and support under the Convention and the Paris Agreement at the global level.

17. In relation to adaptation, resilience and co-benefits in agriculture, the AC held a workshop on monitoring and evaluating adaptation in 2013, organized an expert meeting on promoting livelihoods and economic diversification in 2016, prepared an inventory of ongoing monitoring and evaluation work on adaptation under the NWP in 2017, and held a workshop on fostering the engagement of the agrifood sector in increasing resilience to climate change, a monitoring and evaluation event during the NAP Expo, and a workshop on national adaptation goals and indicators and their relationship with the SDGs and Sendai Framework in 2018.

18. Findings from the work of the AC include the following:

(a) At the national level:

(i) There is a need to distinguish between the monitoring and evaluation of the adaptation planning process and of the outcomes of adaptation interventions (e.g. how vulnerability has been reduced, and adaptive capacity and resilience have been enhanced);

(ii) Monitoring and evaluation of adaptation (process and outcomes) takes place at different levels and scales for different purposes; for example, projects are appraised against funding accountability requirements, outcomes of sectoral activities are assessed for country-level reporting and budget tracking, and countries' progress in adaptation is assessed for reporting under the Convention and other multilateral agreements. The results of monitoring and evaluation demonstrate successes and challenges and provide evidence of impact;

(iii) There are no universally accepted global adaptation monitoring and evaluation systems, but some country-specific monitoring and evaluation systems that can be applied in development planning and adaptation processes have been developed;

(iv) When developing national monitoring and evaluation systems for adaptation (frameworks, indicators, institutional arrangements) on the basis of such systems in other processes, it is necessary to ensure that the new systems are adaptation-sensitive and integrative across sectors;

(v) Building on existing monitoring and evaluation frameworks for other applications can be more effective than creating new frameworks. Although complete

¹¹ Karttunen K, Wolf J, Garcia C, et al. 2017. *Addressing agriculture, forestry and fisheries in national adaptation plans*. Rome: FAO. Available at https://www4.unfccc.int/sites/NAPC/Documents%20NAP/Supplements/FAO_Addresssing%20Agriculture%2c%20Forestry%20and%20Fisheries%20in%20NAPs.pdf.

harmonization of monitoring and evaluation systems for different agendas (e.g. the Paris Agreement, 2030 Agenda for Sustainable Development and Sendai Framework) may not be feasible, some degree of synergy among them could be beneficial for building resilience comprehensively in societies, saving resources and time, and enhancing efficiency in reporting;

(vi) Strengthening linkages between monitoring and evaluation systems across administrative levels and spatial scales could facilitate countries' implementation of multiple agendas and use of the monitoring and evaluation results for meeting multiple needs;

(b) At the global level:

(i) Mechanisms exist at the global level for sharing information that could be used for monitoring progress of adaptation planning and facilitating learning about adaptation (including NAPs, NDCs, national communications, adaptation communications and the proposed modalities for recognizing the adaptation efforts of developing country Parties);

(ii) It has proven difficult to aggregate project- and national-level outputs and outcomes of adaptation in order to capture global progress towards strengthened adaptive capacity, reduced vulnerability and enhanced resilience. Metrics are evolving but require further testing for broader acceptance;

(iii) Further technical work and political discussion are needed to evaluate adaptation progress at the global level, including progress towards the global goal on adaptation under the Paris Agreement.

19. The AC has been mandated to develop an inventory of methodologies for assessing adaptation needs in collaboration with the LEG, the NWP and other stakeholders by June 2020 and to prepare, with the engagement of IPCC Working Group II, a technical paper on methodologies for assessing adaptation needs on the basis of submissions from Parties and non-Party stakeholders on the development and application of such methodologies by November 2022.¹² As requested at COP 21,¹³ the AC, the LEG and the Standing Committee on Finance have been compiling methodologies for reviewing the adequacy and effectiveness of adaptation and support as input to the global stocktake, the objective of which is to review overall progress towards achieving the global goal on adaptation under the Paris Agreement.

20. A representative of the LEG summarized its work on assessing progress in the process to formulate and implement NAPs, and its work in collaboration with the AC on methodologies for supporting the global stocktake.

21. Since 2001, the COP has mandated the LEG to support the least developed countries, including by supporting the implementation of the least developed countries work programme; the preparation and implementation of NAPAs; the process to formulate and implement NAPs; and their access to the GCF. As requested at COP 17,¹⁴ the LEG produced technical guidelines on the process to formulate and implement NAPs,¹⁵ and various organizations have subsequently prepared supplements (as at July 2019, there were at least 25) to those guidelines to elaborate on elements of NAPs.¹⁶

22. The LEG is developing the NAP-SDG iFrame, an integrative framework for considering the SDGs, Sendai Framework and other frameworks in the context of NAPs. It is based on a systems approach to analysing, assessing, planning and implementing adaptation and will address multiple considerations in assessing vulnerability and risk, including climatic hazards, geographical scope, sectors, actors, and targets under different agendas. As an example of how the approach works, in addressing food security, the focus

¹² Decision 1/CP.21, para. 42(b), and decision 11/CMA.1, para. 15.

¹³ Decision 1/CP.21, para. 45(b).

¹⁴ Decision 5/CP.17, para. 13.

¹⁵ LEG. 2012. *National adaptation plans: Technical guidelines for the national adaptation plan process*. Bonn: UNFCCC. Available at <https://www4.unfccc.int/sites/NAPC/Guidelines/Pages/Technical-guidelines.aspx>.

¹⁶ Available at <https://www4.unfccc.int/sites/NAPC/Guidelines/Pages/Supplements.aspx>.

could be on production (of crops, fish or livestock), food distribution, food trade (at the national, regional or global level), strategic reserves, access or utilization (nutritional value). Each of these component systems is supported by its own scientific research and tools, and, from analysing the system dynamics and the impacts of climate change on the system, interventions can be planned and assigned to actors for implementation. A focus on systems, by initially considering individual hazards or the interests of particular actors, helps to simplify the design of adaptation interventions. The NAP-SDG iFrame is being used by the LEG and its partners to identify new ways of structuring adaptation planning, knowledge management and assessment.

23. National governments have developed monitoring and evaluation systems for specific end uses. Three types of adaptation monitoring and evaluation system are common at the national level, addressing the process to formulate and implement NAPs, adaptation outcomes (e.g. reducing vulnerability, enhancing resilience) and support for adaptation projects and programmes. The LEG has developed a tool for monitoring and assessing progress, effectiveness and gaps in relation to the process to formulate and implement NAPs.¹⁷ The tool focuses on the 10 essential functions of the process¹⁸ and provides indicative questions in a checklist that enables countries to monitor and evaluate the delivery of each essential function in their national process.

24. The LEG supports the SBI in assessing progress in the process to formulate and implement NAPs by preparing an annual report that contains statistics on activities of developing countries relevant to NAPs and a summary of support provided by relevant actors, and by maintaining a running list of good practices, lessons learned, and gaps and needs. In 2018, the LEG, in collaboration with the AC, organized a meeting of Party experts to assess, on the basis of submissions from Parties and synthesis reports, progress in the NAP process against its objectives.¹⁹ The SBI assessment in 2018 concluded that:

(a) Most developing countries had launched their NAP process within the preceding three years only, making it too early to assess the impact of NAPs on reducing vulnerability, increasing resilience or enhancing adaptive capacity;

(b) Progress in integrating adaptation into development policies, programmes and activities has been positive, particularly regarding establishing new institutional arrangements and national regulatory frameworks to lead and direct government efforts on NAPs; including adaptation responsibilities in existing government institutional arrangements; considering climate change adaptation in government and sectoral development plans; and establishing national trust funds for climate change;

(c) Baseline data on countries' vulnerabilities and risks against which to assess progress of adaptation are essential;

(d) A plan providing a record of stated goals, objectives and targets, as appropriate, and other relevant details to inform the assessment and against which to measure and assess progress is essential.

25. To promote the sharing of experience and good practices among countries, the LEG organizes NAP Expos, regional and global outreach events at which country teams can meet with providers of financial support (e.g. the GCF and the GEF) and technical support and with other organizations and centres that may help them to advance their NAP process.

B. Methods and approaches for assessing adaptation co-benefits in agriculture

Overview presentations by invited organizations

26. A representative of the World Bank provided an overview of its work in measuring the environmental, social and economic co-benefits of adaptation in the agriculture sector, with a focus on indicators for climate-smart agriculture projects. The World Bank supports

¹⁷ See https://unfccc.int/files/adaptation/application/pdf/50301_04_unfccc_monitoring_tool.pdf.

¹⁸ See document FCCC/SBI/2013/15, para. 43.

¹⁹ See decision 5/CP.17, para. 1.

adaptation through its Pilot Program for Climate Resilience, climate-smart agriculture and other initiatives, and has developed a rich database of information on the projects it supports and baseline country data.

27. The World Bank applies various methods and approaches for assessing adaptation, adaptation co-benefits and resilience in the climate-smart agriculture projects and programmes it supports. All projects undergo four processes: climate and disaster risk screening; greenhouse gas accounting; shadow carbon pricing, which accounts for carbon externalities in economic and financial analysis; and climate finance tracking. Climate finance is reported following an approach developed by multilateral development banks to determine the shares of project finance dedicated to climate change adaptation and to mitigation. Adaptation co-benefits are determined on the basis of a contextual analysis, while mitigation co-benefits are determined on the basis of a positive list of qualifying activities. Theory of change provides the basis for identifying context-specific integrated resilience indicators: the desired long-term outputs and outcomes of a project as part of a results chain, and subsequently related resilience metrics, can be identified.

28. Resilience is complex to measure and requires multiple metrics for different actors, purposes and time-horizons. The discrepancy between project time-horizon (four to seven years on average) and the potential decades needed to observe statistically significant changes in resilience given climate variability means that resilience metrics have to rely on proxies for outcomes of specific investments.

29. Examples of the use of measurement-related technologies and monitoring results in implementing adaptation action on the ground include automated sensors of soil moisture used in crop production to provide real-time information to support operational decisions, and geospatial technology used to collect data for monitoring soil moisture and health. Online platforms such as Uruguay's national agricultural information system can facilitate the aggregation of data on agriculture, natural resources and climate from numerous national agencies and tailor the available information to meet the needs of different users.

30. The World Bank is developing additional tools and approaches for assessment, monitoring and evaluation as part of its 2025 climate change commitments. A resilience rating system applicable to projects led by the World Bank and other entities will enable better measurement and reporting of adaptation and resilience; create incentives to enhance ambition towards climate-resilient growth objectives; and create a global standard for use in financial markets (e.g. resilience bonds) and public procurement (e.g. infrastructure projects).

31. The representative suggested that the KJWA could lead the way in terms of the identification and promotion of co-benefit metrics and indicators. A review of the numerous carbon calculators could be commissioned and guidance on their use issued. Furthermore, multidimensional metrics frameworks could be developed under the KJWA for demonstrating that the overall benefits of climate-smart agriculture, encompassing economic returns on investment and adaptation and mitigation benefits, are greater than the sum of the individual benefits and generate synergy between public and private returns.

32. The overview presentation of CCAFS on adaptation benefits and co-benefits in agriculture was shared. It expressed the view that adaptation to climate change is central to the achievement of all the SDGs, and that adaptation to climate change in the agriculture sector has many co-benefits. Resilience-building interventions foster the dynamic capacity of a system to absorb climate-related shocks and stressors, to adapt to change and to be transformed for the achievement of development outcomes. Those three dimensions of resilience-building entail the following approaches:

(a) Absorbing or coping with a shock through risk management strategies such as changing or adjusting varieties or breeds, insuring crops and livestock and using cash savings;

(b) Proactively responding to changes in external drivers by sustaining or improving productivity and continuing operations by diversifying livelihoods, adopting 'climate proofed' technologies and improved practices, accessing and using climate information and accessing market and financial services;

(c) Transforming the enabling environment for the long term by enhancing governance and conditions for resilience through investment in governance, trading

relationships and formal safety nets, access to infrastructure and services, social protection mechanisms and policies and regulations.

33. In almost half of the NDCs that include adaptation, the importance of monitoring and evaluation was underlined and ongoing or planned efforts to learn (i.e. improve the effectiveness and efficiency of adaptation) and be accountable (i.e. demonstrate that action has led to a result) were mentioned. However, relatively few countries have designed and implemented a national system for adaptation monitoring and evaluation, with most focusing on the programme or project level. The approaches that countries have developed combine qualitative analysis and quantitative indicators (from 3 to more than 100 in a system), which are used to monitor trends in climate exposure and vulnerability, impacts of climate events and adaptation processes or outcomes.

34. Governments developing national-level monitoring and evaluation frameworks and indicators that address adaptation co-benefits and resilience have made the following observations:

- (a) The impacts and outcomes of adaptation actions can only be assessed over long timescales;
- (b) Resilience is multidimensional (e.g. economic, financial, environmental, social) and achieved at multiple scales and in multiple sectors, so information used to assess outcomes needs to be aggregated across the different dimensions;
- (c) Dealing with uncertainty, which is inherent to understanding the climate system, is especially difficult for countries facing capacity and resource constraints;
- (d) Initiatives and frameworks for adaptation monitoring and evaluation at all levels have proliferated and require some alignment.

C. Presentations by representatives of Parties on assessing adaptation, adaptation co-benefits and resilience

35. A representative of the African Group stressed the importance of climate change adaptation in the agriculture sector in Africa, highlighting that climate change impacts and risks threaten the economic development of rural areas, where the majority of the population lives and depends on agriculture. While other drivers of land-use change threaten the sustainability of agriculture, climate change enhances its vulnerability. Agriculture in Africa is largely fed by rain and dominated by smallholders. Farmers have rudimentary production tools and limited access to external inputs such as improved seeds, agrochemicals and fertilizers. Agricultural productivity in Africa equates to 35 per cent of the global average; agroprocessing capacity is also limited.

36. Adaptation in agriculture can bring many co-benefits:

- (a) Higher income and better-quality jobs resulting from adapted crop and livestock systems, and value chains;
- (b) Efficient and profitable agricultural systems;
- (c) Enhanced technology development and capacity-building;
- (d) Increased investment in social development (e.g. in education and health);
- (e) Improved gender equity and social harmony;
- (f) Increased carbon sequestration in soils and above-ground carbon stocks;
- (g) A halt in land degradation;
- (h) Increased water and nutrient retention in soils;
- (i) Maintenance of biodiversity.

37. Measuring climate change adaptation, adaptation co-benefits and resilience is essential to tracking the outcomes of adaptation projects with a view to lessening maladaptation and prioritizing subsequent action. It can also help to ensure the effectiveness

and accountability of investments while helping to monetize and value adaptation co-benefits, which can, in turn, promote implementation of adaptation at the national, subnational and local level. However, an overwhelming number of monitoring and evaluation tools, approaches and methods, each with different objectives, scales and expected outcomes, exist globally. Each country is influenced by its own development agenda and agricultural policies and priorities. As a result, methods and approaches for measuring adaptation and resilience are mainly based on conventional monitoring and evaluation frameworks for projects and programmes, while methods and approaches for measuring adaptation co-benefits are mainly qualitative. Methods and approaches for measuring adaptation, adaptation co-benefits and resilience thus are inadequate and lacking a quantitative dimension.

38. The African Group recommended that the SBI and the SBSTA:

(a) Take stock of the existing methods and approaches for assessing adaptation, adaptation co-benefits and resilience for identifying gaps;

(b) Develop an appropriate framework to guide the tracking of adaptation, adaptation co-benefits and resilience in the agriculture sector at all levels and scales, which could facilitate the effective implementation of NDCs, NAPs and climate policies and also the assessment of the progress, adequacy and effectiveness of global adaptation in a systematic, rigorous and transparent manner. The framework developed should be credible, transparent, accurate, reproducible, measurable and understandable, and should facilitate identifying trends;

(c) Facilitate international cooperation and support with regard to financial resources and capacity-building for the application of the framework, or other relevant methods or guidance, for tracking adaptation, adaptation co-benefits and resilience in order to enhance implementation of NDCs, NAPs and climate policies.

39. A representative of Japan highlighted its 2018 Climate Change Adaptation Act as the national framework within which methods and approaches for assessing adaptation, adaptation co-benefits and resilience are being developed. The Act clarifies the roles of national and local governments, the private sector and citizens in promoting climate change adaptation. The Japanese Government has formulated a NAP and is developing methodologies for monitoring and evaluating progress of adaptation. The NAP is to be revised every five years on the basis of climate change impact assessments. Local governments are formulating local climate change adaptation plans.

40. The representative emphasized that assessing climate change impacts and adaptation effects, including on crop production, requires scientifically sound data and estimates, and that climate change adaptation and mitigation cannot be separated when considering agriculture, which was acknowledged in the design of the KJWA.

41. The representative of Norway indicated that the Party does not have specific approaches or methods for assessing progress of adaptation. The Party's priorities regarding food security include domestic production (maintaining productive capacity) and global trade and cooperation. The national Government supports farmers' ownership of their own farms, addresses market failures in the agricultural system and is responsible for establishing sanitary standards, implementing warning systems and managing genetic resources.

42. According to the representative, assessing adaptation entails the ex ante assessment of adaptation options, the continuous assessment of systems and needs, and the ex post assessment of outcomes and impacts of action. In the case of agriculture, it is essential to consider not only natural, agricultural and food systems, but also institutional and policy systems. Because adaptation and resilience are context specific, defining universal metrics for assessing adaptation, adaptation co-benefits and resilience is difficult, but bottom-up approaches with farmer participation are recommended. Also, supporting diversification of the agriculture sector and nature-based solutions, with a focus on soils, should be encouraged.

43. A representative of the European Union highlighted the regional and local adaptation measures and indicators that exist and could pose challenges to the development of a global approach to monitoring and evaluation. The European Union, for example, has a common agricultural policy with mitigation and adaptation objectives and a monitoring and evaluation framework for adaptation comprising impact, result and output indicators. Satellite data

provided by the Copernicus programme are essential for assessing climate change risks and resilience.

44. Since 2010, adaptation to climate change in agriculture has been a national strategic goal for sustainable development in Uruguay. Since 2017, it has been supported by the FAO Integrating Agriculture in National Adaptation Plans programme in developing a national strategic plan for adaptation to climate change in the agriculture sector with a view to reducing vulnerability, filling knowledge gaps and learning lessons. Uruguay's efforts include developing an interactive platform for systematic monitoring and evaluation.

45. Following the approach of FAO (see para. 14 above), Uruguay adopted four categories of indicators. Early lessons from their implementation are as follows:

- (a) No single set of indicators was found to fit all adaptation situations (e.g. sectoral, cross-sectoral, national, regional);
- (b) A solid vulnerability assessment was observed to be a prerequisite for applying a monitoring and evaluation system effectively;
- (c) Monitoring and evaluation systems that are compatible with NAPs, NDCs and SDGs prevented duplication of effort;
- (d) Lack of quality information was one of the main challenges in tracking progress of adaptation, but strengthening data collection systems is a resource-intensive process;
- (e) A combination of process and results indicators was needed to reflect the long-term nature of adaptation;
- (f) A combination of quantitative and qualitative information was needed to better understand farmer behaviour and improve policy design, which highlights the critical role of monitoring and evaluation systems in learning;
- (g) It was useful for the monitoring and evaluation toolbox to include a protocol for the systematic and consistent assessment of loss and damage;
- (h) Systematic monitoring of weather conditions was useful in understanding how agroecosystem structures and functions respond to adverse impacts.

46. The representative of Uruguay put forward the following future activities in relation to the KJWA:

- (a) Compiling existing methods and approaches that have been used to assess adaptation progress in agriculture by Parties, and the secretariat preparing a technical report for consideration by the subsidiary bodies;
- (b) Preparing flexible methodological frameworks to help Parties in developing their own methods and indicators for monitoring and evaluating adaptation;
- (c) Using effective mechanisms to facilitate knowledge-sharing among Parties (e.g. web platform, publications);
- (d) Providing guidance through the COP to the appropriate constituted bodies and Financial Mechanism entities on capacity-building for and technology transfer to developing countries for strengthening their monitoring and evaluation systems with a view to more effectively implementing their NAPs, preparing their adaptation communications and achieving their NDC adaptation goals.

D. Adaptation work of Financial Mechanism entities

47. As at 18 June 2019, the GCF had committed to supporting 70 adaptation-related projects, with funding amounting to USD 2.8 billion and an additional USD 8.2 billion leveraged. The projects are expected to benefit 276 million people by increasing the resilience of people's and communities' livelihoods, infrastructure and the built environment, ecosystems and ecosystem services, health systems, food systems and water security. The anticipated outcomes of the projects include strengthened government, institutional and

regulatory systems for climate-responsive development planning; increased generation and use of climate information in decision-making; strengthened adaptive capacity and reduced exposure to climate risks; and greater awareness of climate threats and risk-reduction processes. Agriculture is one of the focus areas of the projects; the performance indicators include the percentage of food-secure households and the area of agricultural land made more resilient to climate change through altered agricultural practices.

48. Each GCF project undergoes climate and sectoral reviews. The performance of a project in these reviews is assessed against the following investment criteria:

- (a) Impact: the gender-disaggregated number of direct and indirect beneficiaries;
- (b) Paradigm shift: the contribution to sustainable climate-resilient development; the degree of knowledge exchange and learning; the extent to which enabling environment is created or enhanced; and the extent to which regulatory frameworks and policies are strengthened;
- (c) Sustainable development: the economic, social, health, gender, environmental and mitigation co-benefits;
- (d) Needs of recipients: the vulnerability to climate change of the population, paying particular attention to vulnerable groups and gender aspects;
- (e) Country ownership: the project's alignment with country priorities and its contribution to NAPs;
- (f) Efficiency and effectiveness.

49. The representative of the GCF stressed the importance of designing adaptation projects on the basis of climate science and analysis of primary data, modelling, literature and stakeholder consultation. The project definition should include the desired paradigm shift and the underlying theory of change. Grounding the design of adaptation projects in science is critical to ensuring multiple co-benefits. In many cases co-benefits are not measured or reported, although they likely enhance the impact of the investment.

50. The GCF Readiness Programme provides countries support for project preparation, climate analysis and capacity-building.

51. Meanwhile, the GEF administers the LDCF and SCCF, which together have provided USD 1.75 billion in funding for adaptation projects – 282 under the LDCF and 79 under the SCCF. The projects have benefited 28 million people and resulted in 7 million ha climate-resilient agricultural land. Supporting adaptation in agriculture is a major priority of the GEF, with agriculture being identified as a priority in 96 per cent of NAPAs and 73 per cent of NAPA projects relating to agriculture. The co-benefits of agriculture projects (climate change mitigation, reduction in land degradation and biodiversity conservation) are central to the work of the GEF.

52. When assessing the impacts of adaptation projects, the GEF considers resilience as both a product (e.g. resilient infrastructure, automated weather stations, new crop varieties) and a long-term process resulting in institutional capacity-building or new policy development. The resilience-building process of absorbing shocks, adapting to change and transformation captures directly attributable benefits; value chain and system-level benefits (e.g. a resilient food system); contributions to national development objectives; systemic and transformational change in relation to climate policy and governance; and social inclusion benefits, including gender-disaggregated benefits. The GEF strives to capture qualitative results because they provide crucial information for scaling up projects.

53. The LDCF and SCCF adaptation results framework for 2018–2022 provides indicators for tracking progress of adaptation in agriculture projects. The framework focuses on the number of hectares of land under resilient management and the number of beneficiaries.

54. The challenges identified by the GEF regarding approaches and indicators for assessing adaptation, adaptation co-benefits and resilience stem from the indirect and qualitative nature of adaptation results and impacts. In addition, lack of universal methods and indicators means national governments cannot necessarily access relevant tools for assessing mitigation and adaptation in agriculture.

55. The representative of the GEF underlined that assessing the qualitative results of adaptation action is essential, and that adaptation benefits should be captured using innovative methods and enabling activities, such as systems for measuring resilience benefits and climate risks from asset valuation, census data and health data. It was also stressed that many countries require support for developing their own monitoring and evaluation frameworks or systems, and establishing a common understanding of the concepts of co-benefits, synergy, trade-offs and integration would be a helpful first step towards measuring adaptation. The GEF can provide support for enhancing capacity and improving tools and methods under its project for global capacity-building towards enhanced transparency in the agriculture, forestry and other land-use sector.

56. The Adaptation Fund currently supports 84 adaptation and resilience projects directly benefiting 6 million people. Agriculture projects represent 16 per cent of the Fund's portfolio with funding amounting to USD 86.6 million shared among countries in Africa (36 per cent), Asia-Pacific (34 per cent) and Latin America and the Caribbean (30 per cent). Some water management, rural development or food security projects, as well as a few cross-sectoral projects, also have agriculture components. The Adaptation Fund does not prioritize agriculture projects; funds are allocated to national implementing entities on the basis of numerous criteria.

57. Highlighted examples of agriculture-related projects currently supported by the Adaptation Fund include a climate adaptation programme for water and agriculture in Eritrea; a climate adaptation project for oasis zones in Morocco; a project to build the resilience to climate change and variability of vulnerable smallholders in Uruguay; and a project on climate-smart action and strategies for achieving sustainable livelihoods of agriculture-dependent hill communities in India.

E. Cross-cutting perspectives of non-State actors

58. Representatives of observer organizations presented their perspectives at the workshop and in submissions beforehand. A representative of the farmers constituency highlighted the positive role that digitization and biotechnology can play in fostering climate-smart agriculture. Frontier technologies can enhance agricultural productivity while reducing resource consumption, thus building the resilience of farmers to the impacts of climate change. Making such technologies available to farmers and fully responsive to climate challenges should be supported. The representative highlighted the need to enhance food security by improving productivity and resilience, focusing at the same time on poverty eradication and taking into account gender considerations. Indicators that are easy to use and simple in terms of communicating results are recommended by the constituency. The resilience of farmers should be increased by securing crop and livestock genetic diversity, researching and enabling access to sustainable technologies, ensuring ecological integrity and supporting farmers' innovations.

59. A representative of youth non-governmental organizations recommended that adaptation in the agriculture sector be addressed jointly with climate change mitigation, food security and biodiversity conservation. The KJWA should promote agroecological approaches as priority adaptation measures in the agriculture sector in order to enhance ecological services (e.g. carbon sequestration, pollination, natural pest management) and decrease reliance on chemical inputs and fossil fuels. Agroecology can yield many co-benefits, such as improved soil fertility, food security and sovereignty, protection of farmers' rights, job creation, empowerment of smallholders (including women), restoration of ecosystems, improved human health, and transmission of local and indigenous peoples' knowledge. Indicators for measuring adaptation, adaptation co-benefits and resilience should take into account, through qualitative analysis, those co-benefits and all possible negative impacts.

60. A representative of environmental non-governmental organizations addressed how measuring adaptation, adaptation co-benefits and resilience in the agriculture sector can be scaled down to measuring the adaptive capacity acquired by farmers through their participation in designing and implementing projects and to tracking the uptake of

agroecological approaches. The active participation of farmers, especially women and marginalized community farmers, ensures that projects respond to the needs of those most affected by them. Civil society organizations can support discussion and analysis at the community level and present findings to government. Agroecology has multiple benefits, including improved soil health, biodiversity conservation, increased yields, reduced risk – through seed and crop diversification – of agricultural losses, and women’s empowerment.

61. A representative of the International Indigenous Peoples Forum on Climate Change highlighted that the recently adopted Local Communities and Indigenous Peoples Platform workplan is a step towards recognizing the value of indigenous peoples’ knowledge systems. Adaptation to climate change is essential for indigenous peoples’ livelihoods, food security and medicine; however, it is important to distinguish between hunting and gathering, shifting cultivation, grazing, operation of small-scale agricultural systems and communal agroforestry. There is an urgent need to reduce the impacts – greenhouse gas emissions, destruction of forests and natural resources and other environmental impacts related to land-use change – of large livestock and agro-industrial companies. It was recommended that the KJWA focus on two distinct issues: the effects of climate change on small-scale agriculture and pastoralism; and the effects of industrialized agriculture on global warming, deforestation and food security. Indigenous agricultural systems, health systems and life systems should be recognized and supported by government.

IV. Summary of discussions and the way forward

A. Assessing adaptation at different levels

62. The diverse ways of and reasons for monitoring and assessing adaptation and resilience were addressed at the workshop. At the global level, adequacy and effectiveness of adaptation and support are monitored and assessed regularly under relevant multilateral agendas to track progress in addressing mandates and identify obstacles and gaps in order to guide further policy action. An element of this process is the sharing of experience (successes and challenges), lessons learned and best practices. Methodologies for the global stocktake in relation to the global goal on adaptation under the Paris Agreement are being developed by the CMA with support from constituted bodies.

63. At the national level, countries track elements of adaptation to support planning, implementation and reporting under the Convention, often coordinated with reporting under other international agendas. Countries have developed monitoring and evaluation systems and are applying metrics of their choice. In many cases, systems are being developed by (nationally defined) sector. Some international agendas (2030 Agenda for Sustainable Development and Sendai Framework) have defined universal indicators. The need to promote synergy of reporting requirements under the main international agendas (i.e. the Paris Agreement, 2030 Agenda and Sendai Framework) was highlighted, which could be addressed at the multilateral level or within countries by the various ministries coordinating their relevant work towards meeting the different reporting requirements.

64. At the project level, funding entities have developed rigorous methods for monitoring programmes and projects. Various metrics are used for appraising project proposals to support funding decisions, while specific monitoring and evaluation systems have been developed to track project implementation and ensure expected results are achieved. After implementation, independent evaluations are conducted to assess whether project goals and objectives were achieved and to identify lessons learned. To the extent possible, the metrics used are quantitative and designed to be easy to measure and verify. The number of beneficiaries and hectares of land under sustainable or resilient management are indicators used by the GCF, the GEF and the Adaptation Fund. Using universal indicators for measuring the outcomes and impacts of adaptation projects in the agriculture sector across funds could facilitate global-level reporting. Similarly, criteria at the project-design level and indicators at the project-output level could form a sound basis for further harmonization.

B. Long-term impacts of adaptation

65. The impact of specific adaptation action on long-term resilience remains an area of discussion and can only be observed over the long term. This is also the case for adaptation co-benefits, notably addressing multilateral agendas and contributing to mitigation and low-carbon development. One way of addressing this issue is to develop investment plans spanning a longer time frame than the typical three to six years of individual projects (such as those under the GEF and the GCF). Such planning under climate-smart agriculture would require countries and farmers to make radical changes in farming practices in order to realize a paradigm shift and transformational adaptation in agriculture.

66. The GCF, for example, considers the potential impact of a project as part of a theory of change approach that takes into account the overall climate sensitivity and exposure to climate risks of a country and the vulnerability of its population groups based on socioeconomic variables. Project proposals should provide evidence of the potential impact of the project, perhaps through the definition of intermediary indicators for the measures to be implemented through the project and reported on (if provisions are in place to monitor them). The GEF has independent evaluators perform ex post evaluation 5 to 10 years after project completion to assess the actual resilience of beneficiaries, land or ecosystems resulting from an adaptation project. Such evaluation focuses on the long-term impact and sustainability of the benefits generated by the project. Under the Adaptation Fund, ex post evaluation determines the hectares of land that have been sustainably restored through a project, leading possibly to adjustment of previously reported figures.

67. Systematic national data collection covering all aspects of adaptation and resilience and canvassing broad groups of stakeholders, including farmers, women and civil society, is crucial for assessing the outcomes and impact of adaptation over time. The data collected are useful for establishing baseline conditions and monitoring changes, and in ensuring that adaptation is addressing the targeted needs. Ideally, the data collection should not be a stand-alone activity, but an addition to the ongoing efforts of national statistical offices.

C. Transformative approaches to adaptation

68. It is generally accepted that successful adaptation to climate change requires transformation and paradigm shifts to overcome limits to adaptation and avoid system failures. Criteria and approaches for assessing transformation, paradigm shift and transformative adaptation in the agriculture sector is an area of active research. A high-level objective of the GCF, for instance, is to promote a paradigm shift to low-emission, climate-resilient sustainable development through its investments. Paradigm shift is also assessed as an investment criterion by considering how a project contributes to system change through modification of the regulatory framework or policymaking, which in turn facilitates scaling up the project. The GCF has initiated the development of sectoral guidance and strategies for identifying transformative pathways and prioritizing investment. Countries are encouraged to utilize GCF readiness funds in elaborating what a paradigm shift to climate-resilient agriculture would involve in their national context. This work could facilitate the inclusion of transformative adaptation in national planning and subsequent investments.

D. Challenges in supporting adaptation

69. At the global multilateral level, monitoring and assessment by the subsidiary bodies is used to identify and share lessons and challenges. A major challenge discussed at the workshop is the formulation of project proposals, including defining the climate rationale for adaptation activities in the face of uncertainty and aligning national priorities with fund objectives.

70. The difficulty of defining climate rationale was acknowledged and it was highlighted that GCF readiness funds can be used for project preparation, including to carry out any required analysis. Regarding uncertainty, the adaptation interventions proposed must be

sufficiently robust or include sufficient options for addressing the variability of the climate scenarios being considered.

71. Monitoring and assessment requires dedicated resources. While most funding for projects includes funding for evaluating the project, it is challenging for countries to generate adequate support for national systematic monitoring and assessment. Capacity-building is another important need, including in relation to reporting under the Convention and the Paris Agreement. Greater flexibility in the support provided, such as through the GEF for transparency, could help in addressing specific country needs, such as support for using promising technologies for data collection and the support required by farmers.

E. The way forward

72. The co-facilitators welcomed the fruitful exchanges at the workshop, where challenges common to developed and developing countries in measuring adaptation, adaptation co-benefits and resilience, as well as diverse ways of addressing such challenges, were highlighted. Although various tools are available for measuring adaptation and its co-benefits, they may need to be adjusted for specific circumstances. Sharing good practices among countries and other stakeholders could support the adjustment process. Science and technology have important roles to play in facilitating data collection and adaptation assessment.

73. A global methodological framework comprising metrics and indicators for measuring adaptation, adaptation co-benefits and resilience in the agriculture sector could help countries to develop their own metrics and indicators as part of their national adaptation monitoring and evaluation systems. Such a framework could reduce the reporting burden on countries under the Paris Agreement, the Sendai Framework and the 2030 Agenda for Sustainable Development. It could also facilitate the aggregation of data for reviewing the adequacy and effectiveness of adaptation and support and progress towards the global goal on adaptation. Further, the framework could facilitate the preparation of project proposals under the Financial Mechanism, which could in turn increase financial flows to developing country Parties.

74. The global methodological framework could be developed by Parties, constituted bodies, the IPCC, relevant United Nations organizations and other relevant stakeholders in close collaboration under the guidance of the subsidiary bodies. A stocktake of existing methods and approaches for assessing adaptation, adaptation co-benefits and resilience in agriculture could be conducted as a first step, and the framework would need to be piloted and tested. Meanwhile, it would be critical to enhance mechanisms for knowledge-sharing among Parties and stakeholders and to strengthen capacity-building, technology transfer and financial flows for supporting the design and implementation of national multilevel monitoring and evaluation systems.

75. The global stocktake will entail an assessment of global adaptation progress as early as 2023, which poses challenges that need to be anticipated and addressed as soon as possible through national monitoring and evaluation systems and possibly a global methodological framework. Countries have set or are in the process of setting their own adaptation goals through NAPs, the achievement of which should be supported by means of context-specific and evolving monitoring and evaluation systems.