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Contribution by FAO

to the CSTD 2019-2020 priority theme on “Harnessing rapid technological change  
for inclusive and sustainable development”

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**MESSAGE TO CSTD MEMBERS TO INVITE INPUTS ON THE PRIORITY THEMES**  
**2019-2020**

The CSTD secretariat is in the process of drafting an issues paper on the theme to be presented at the CSTD inter-sessional panel meeting. This paper will serve as the basis for the UN SG Report on the same topic that will be presented at the 23<sup>rd</sup> session of the CSTD in March 2020. In this context, we would like to solicit inputs from the UN System on this theme. We would be grateful if you could kindly answer the following questions based on your experience from your Agency.

**PRIORITY THEME 1:** Harnessing rapid technological change for inclusive and sustainable development

We live in a time of growing prosperity alongside growing concerns about inequality. Recent developments in frontier technologies (e.g. AI, robotics, big data, blockchain, space technologies, biotechnology, and nanotechnology) have shown tremendous potential for making development truly sustainable, but they also have raised fears of increasing disparities by worsening and creating new divides between the technology-haves and have-nots. This priority theme will critically examine how to make frontier technologies work for all. The analysis will explore the potential of frontier technologies to improve inclusiveness not only in terms of income, gender, various age groups, people with special needs or other groups facing specific challenges, but also to improve the situation of small economies including Least Developing Countries, Landlocked Developing Countries, and Small Island Developing States. The analysis will focus on the strategies, policies and immediate actions at national and international levels for creating an environment for harnessing frontier technologies to ensure that no one is left behind.

1. Can you provide examples of initiatives of your Agency for creating national ecosystems for innovation on frontier technologies for inclusive and sustainable development?

The use of platforms for sharing and disseminating practices and technologies, the implementation of Agricultural innovation assessments processes and strategies for inclusive sustainable development.

Some initiatives/examples are:

- The FAO platform on technologies and practices for small agricultural producers (TECA, <http://www.fao.org/teca/en/>);
- Development of assessments of the national agricultural innovation and extension systems (ongoing in a number of countries now, <https://umr-innovation.cirad.fr/en/news/expert-consultation-on-the-development-of-a-methodology-to-assess-agricultural-innovation-systems-13-14-15-june-2018-cirad-paris>)
- Development of capacities to strengthen national agricultural innovation systems, through the Tropical Agriculture Platform and the EU-funded CDAIS project <http://www.fao.org/in-action/tropical-agriculture-platform/en/> and <https://cdais.net/home/>)
- Bringing the international community together to exchange knowledge, learn from each other regarding innovation and the use of technologies, including frontier technologies, in their national ecosystems (see relevant references in Section 6 to global meetings on solar technologies, biotechnologies, agricultural innovation, digital innovation etc.)
- Youth Entrepreneurship and Innovation Network:
  - #HackAgainstHunger Innovation Challenges: bringing together diverse public and private sector experts to mentor young innovators and agripreneurs to develop high-potential digital solutions to address challenges faced by food and agriculture systems, including through the use of frontier technologies and sustainable business models for the development and adoption. The challenges

have been launched both in partnership with other development agencies and universities, closely linked to high-level global and regional conferences to increase advocacy and awareness for the need to strengthen the national capacity to innovate and invest in agribusiness, in particular related to youth employment.

<http://www.fao.org/about/meetings/youth-in-agriculture/hack-against-hunger/en/>

- Digital Innovation and Entrepreneurship Workshops: Following these challenges, and with a view to increase our engagement beyond hackathons, we have also invited several of the winning innovators to FAO to attend conferences, network, and participate in a bootcamp where they meet with FAO technical experts in the areas specifically related to their innovations to receive hands-on advice and share insights on key areas in digital agriculture. <http://www.fao.org/e-agriculture/node/15702>
- FAO-KT Youth Entrepreneurship and Innovation Incubator: Private sector partnership to focus on digital technologies, including frontier technologies, for agrifood and engaging youth in smart farming and agribusiness to strengthen the national capacities through mentorship and training in Asia. <http://www.fao.org/news/story/en/item/1197915/icode/>

2. What are the most effective ways to support the improvement of skill levels and better match the supply and demand of skills?

The most effective way to support the improvement of skill levels and better match the supply and demand of skills is to ensure the constant understanding of the national ecosystems, its links, opportunities and challenges to be addressed in order to update strategies and implementation plans that are essential to creating both the technical assistance programmes and the system changes needed to foster the improvement at policy and institutional level. In other words, national designing of programmes must aim to improve the enabling environment within which the interventions are designed in as well ensure that key priority areas are addressed throughout the technical assistance design phase, such as direct training and mentorship programmes, tool and platform selection, such as gender equality and inclusiveness, cultural knowledge, climate-smart practices and the preservation of traditional farming practices, etc). In addition, in order to ensure efficient programmes, there must be an understanding of the root causes of existing gaps in skills or in the supply and demand of skills, and identify the priority problems that need solutions in order to establish a strategic and targeted national roadmap to strengthen skills and develop capacities in sustainable and inclusive way, which includes ensuring strong local involvement of both public institutions and private sector as well as establishing knowledge exchange programmes to learn from success stories both at national and regional level.

3. What is the role of the government in facilitating a fair relation between workers and employers in the digital economy? What are the current options and lessons learned from policies to protect people affected by rapid changes in labour markets (e.g. greater benefits for those whose jobs are destroyed, retraining, federal job guarantee)? What is the role of redistributive policies to ensure that no one is left behind in a world of rapid technological change?

The role of the government is to create participatory dialogues among the diverse range of stakeholders and decision-makers, to develop new partnerships and business models that involve the public and private sectors, civil society, research, extension and farmer organizations in driving the digital economy while ensuring that no one is left behind. There is a need for a holistic approach where all stakeholders are involved and concrete mechanisms to support and implement coordinated actions, including investments. This requires interventions at policy-level to reflect the systemic changes that are being generated by the shift to a digital, such as new institutional

roles to mitigate the negative impacts of rapid changes to the labour market and the implications of shifting to a digital economy.

3. Can you provide examples of STI policies/projects/initiatives intended to promote and give directionality to technological change to make it work for inclusive and sustainable development? Are there policies/projects/initiatives that mitigate the potential negative effects of rapid technological change on inequality? Are there any of these policies/projects/initiatives directed to women, youth, people with special needs or other groups facing specific challenges? How have the policies targeted inequalities? What are the challenges confronted in implementing these policies/projects/initiatives?

Projects and Initiatives:

- Dimitra Clubs in sub-Saharan Africa;
- Securing land tenure rights for farmers in Sierra Leone;
- Indigenous people actions: Use of traditional agricultural practices are better adapted to a changing climate (like the high altitudes of the Andes or the dry grasslands of Kenya), conserve and restore forests and natural resources, help expand and diversify diets and cultivate indigenous crops that are more resilient to climate change.
- Establishing the Digital Council for Food and Agriculture (See Question 1). This initiative aims to fill the need for an advisory model to ensure that the digital transformation of the agri-food sector has a benchmark for best practices, recommendations, and strategic guidance on how to ensure sustainability and inclusiveness.
- National e-Agriculture Strategies: FAO is currently revising the existing national e-Agriculture strategies to address the implications of digitalisation and its effects on the agri-food sector and related value chains to improve support to national governments who are going through the process of digitalisation.

Challenges:

One of the main challenges is the lack of governance models for the ethical use of digital technologies and the extensive data derived from the use of digital technologies, for example related to issues of data privacy. On the other hand, another main challenge remains the lack of baseline data and information on national skills and capacities, use of technologies, etc.

4. Can you provide examples of innovative initiatives in partnership with (or by) the private sector in/from your country that harnesses frontier technologies for inclusive and sustainable development? What are the innovations in terms of the use of technology? What are the innovations in terms of business models?

Examples;

- Ensuring animal health in Afghanistan - and beyond (12 million animals vaccinated and regional cooperation on disease control increased);
- Strengthen dairy sector in Ukraine (created an active dialogue between agribusiness companies and the Ukrainian government - a key factor in contributing to sector development. this created a more transparent policy environment conducive to investment and helped to diversify export markets for dairy products).
- FAO-Telefonica partnership to leverage IoT and Big Data to improve access to information related to climate and water management in the Central American Dry Corridor: <http://www.fao.org/news/story/en/item/1099923/icode/>
- FAO-Google Earth Engine Partnership to use geospatial data for mapping and forecasting of land cover/use change, crop yields, water productivity and drought, animal health and migrating pests, livestock density, biodiversity, climate change impacts, etc <http://www.openforis.org/tools/collect-earth.html>
- FAO Digital Services Portfolio: <http://www.fao.org/about/meetings/digital-agriculture-transformation/resources/fao-digital-services-portfolio/en/>

5. What are the actions that the international community, including the CSTD and STI Forum, can take to contribute to maximize the benefits associated to rapid technological change and mitigate the risk of these technologies widening or creating new inequalities within and across countries? Can you give any success stories in this regard?

Weak technological infrastructure, high costs of technology, low levels of e-literacy and digital skills, weak frameworks /policies and limited access to services mean these areas risk being left behind in the digitalization process. While the potential benefits of digitalizing the agrifood sector are convincing, it will require major transformations of farming systems, rural economies, communities and natural resource management. The digitalization of agriculture will significantly alter the nature of work and the demand for labor and skills. Increasingly, digital literacy will be a requirement in agrifood jobs and suitable education and training will be required as well as access to affordable tools.

At the GFFA 2019, FAO was called upon to coordinate the establishment of an international Digital Council for Food and Agriculture to address the issue of lacking a government model or international institutional framework to address the challenges that will arise due to digital technologies and their transformation of nearly all sectors, in particular labour market and arifood sector. Further action needs to be taken to map existing ecosystems and the level of maturity to develop benchmarks in order to design more efficient and impactful interventions that are measurable.

FAO has recently issues a report on Digital Technologies in Agriculture and Rural Areas to outline the opportunities, challenges, and necessary actions. It indicates that the structuring of a descriptive model that allows us to identify, as a first measure, those elements that characterize the digital transformation in agriculture and rural areas, to the measure or describe its current state, will permit us to make advances in structuring of a common methodology that serves the identification of the opportunities and risk that the digital transformation brings in this sector. Even when this methodology is descriptive, that is, it does not intend to establish the explanatory mechanisms between the different variables, it is in itself an advance that allows structuring of a number of elements, such as technologies, in a holistic vision where not only is the technology an explanatory variable, but also a series of other elements, such as policies and incentives, business models, and in general the conditions that promote or suppress the adoption of digital transformation. The structure is simplified, and it is based on three main interrelated categories. On the one hand, it establishes the level of maturity of adoption of digital technologies, which can be established at the level of:

a) basic conditions: these are the minimum conditions for use of technology, in which the most traditional correspond to its adaptability, including connectivity (mobile subscription, network coverage, and broadband and Internet access) and affordability; educational systems, literacy and employment (in rural areas and agrifood sector); and policies and programmes (e-strategy) for enabling digital agriculture;

b) enablers for adoption of digital technologies: those capabilities that make possible or drive changes using digital technologies (use of Internet, use of mobile and social media), digital skills, agripreneurial and innovation culture (investment, talent development, sprint programmes). On the other hand, the areas of impact of applying digital technologies within the agrifood system, include:

c) taking advantage of technology to improve economic (efficiency, productivity, etc.), social and cultural (food security, digital divide, social benefits, women and youth inclusion, fairness, etc.), and environmental impacts (climate change adoption and adaptation, resilience, sustainability, etc.) through the use of different types of resources. By understanding and measuring the level of

digital maturity, it is possible to identify areas of improvement and acceleration that allow the benefits of this transformative process to be achieved. In general, adopting new technology is a starting point, but it is not a guarantee of achieving the expected results, there are many other elements that are necessary, often sufficient, to achieve these results. Too often, success is defined as implementation, not impact. It is for this reason that it is necessary not only to identify it, but to use it as the guiding element of the work that is developed.

d) Use of frontier technologies for monitoring the progress of SDGs: The monitoring of progress made against SDGs, in particular for the 21 indicators of which FAO is custodian agency, whereby data collection and analytical capabilities benefit from advances in frontier technologies and their greater integration. These lead to improved methodologies (e.g. measuring levels of food insecurity by population groups disaggregated by gender, geographic locations etc.) and stronger evidence. Similarly various early warning and monitoring systems in use or being developed by FAO can benefit from the frontier technologies including digital technologies.

The international community, including the CSTD and STI Forum should further commit to assist governments and partners in setting a systematic and holistic approach in bridging the multidisciplinary digital divides to ensure that everyone benefits from the emerging digital society though increase access to infrastructures, increase access to knowledge through specialized platforms, training, finance, increase agriculture literacy, etc. Facilitation of collection of better data, creation or adoption of successful business models for inclusion of smallholder farmers in the transformation process.

5. Could you suggest some contact persons responsible for policies related to rapid technological change and its impact inequality as well as any experts from your Agency, academia, private sector, civil society or government dealing with projects in this area? We might contact them directly for further inputs or invite some of them as speakers for the CSTD inter-sessional panel and annual session.

For issues related to digital innovation: FAO IT Division/CIO: [cio-director@fao.org](mailto:cio-director@fao.org) or reach out to the Digital Innovation Unit specifically at [digital-innovation@fao.org](mailto:digital-innovation@fao.org)

For all other issues: The FAO Agriculture and Consumer Protection Department ([AG-ADG@fao.org](mailto:AG-ADG@fao.org)).

6. Do you have any documentation, references, or reports on the specific examples on the priority theme in your country or region?

FAO has several reports, documents and examples at country and global levels. These include:

- The report on "[The benefits and risks of solar-powered irrigation - a global overview](#)".
- The [Toolbox on solar-powered Irrigation Systems](#).
- Documents from the International Forum on Solar Technologies for Small-scale Agriculture and Water Management, FAO Headquarters, Rome, Italy, 12-13 April 2018 <http://www.fao.org/land-water/events/solartech>
- The documents and proceedings of the FAO international symposium on “The Role of Agricultural Biotechnologies in Sustainable Food Systems and Nutrition”, held at FAO Headquarters, 15-17 February 2017 <http://www.fao.org/3/i5922e/I5922E.pdf>
- Report on the Outcome of the FAO Regional Meeting on Agricultural Biotechnologies in Sustainable Food Systems and Nutrition in Asia-Pacific, which took place in Kuala Lumpur, 11-13 September 2017 <http://www.fao.org/3/MV835/mv835.pdf>

- Report on the Outcomes of the FAO Regional Meeting on Agricultural Biotechnologies in Sustainable Food Systems and Nutrition in Sub-Saharan Africa, which took place in Addis Abeba, 22-24 November 2017. <http://www.fao.org/3/mv682en/mv682en.pdf>
- Genome editing: FAO expert consultation: Review of biosafety regulatory systems with focus on genome –editing and compatibility with relevant international agreements Prague, Czech Republic, 28/08/2018 - 30/08/2018
- The documents and proceedings of the “International Symposium on Agricultural Innovation for Family Farmers: Unlocking the potential of agricultural innovation to achieve the Sustainable Development Goals”, which took place at FAO headquarters, 21-23 November 2018. <http://www.fao.org/documents/card/en/c/ca4781en>
- FAO document on “Aquaculture innovations, their upscaling and technology transfer to increase efficiency, combat environmental degradation and adapt to climate change, Fao Sub-Committee On Aquaculture Trondheim, Norway, 23–27 August 2019 <http://www.fao.org/3/na401en/na401en.pdf>
- Digital innovation: The FAO thirty-ninth session of the European Commission on Agriculture held in Voronyez 16-18 May, 2018 has discussed digital or e-agriculture advancements and recommended continuous involvement of FAO in providing good practices, tools and mechanisms in e-agriculture for knowledgesharing and provide policy advice and capacity development to maximize benefits and minimize risks.
- The Global Forum for Food and Agriculture held in Berlin, Germany in 2019 recommended that FAO organised Agricultural Digital Council and propose a framework for assessment of the impact and opportunities of the digitalisation in agriculture. <https://www.gffa-berlin.de/en/>.
- FAO-ITU 2019 joint publication: “E-agriculture in Action: Blockchain for Agriculture”. <http://www.fao.org/documents/card/en/c/CA2906EN>
- FAO, ITU and OSCE, according to their mandated, started a fruitful collaboration in providing fora and joint products , such as FAO-ITU national strategy guide on e-agriculture
- Digital Technologies in agriculture and rural areas: Status Report (2019) : <http://www.fao.org/3/ca4985en/ca4985en.pdf>
- FAO Digital Agricultural Transformation Seminar, Rome, 12-13 June 2019. <http://www.fao.org/about/meetings/digital-agriculture-transformation/en/>
- Tackling Poverty and Hunger through Digital Innovation (2018): <http://www.fao.org/3/ca1040en/CA1040EN.pdf>