e-Agriculture Co-ordinating fields to save the environment

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Executive Summary

In this policy brief, we will examine how the e-Agriculture sector has a responsibility to embed climate action within its framework. Climate change presents a growing risk toward farmers in both the Global North and the Global South, and is exacerbated by traditional methods of farming. Therefore, it is crucial that ICT developers place the same emphasis on the adoption of climate smart applications as they do on increasing crop yields and empowering communities. This will help communities build long term capacity against climate change.

Planting the problem

e-Agriculture can be defined as the design, development and application of ICTs in agriculture. ICT innovation has enabled the rapid spread of information, tools and methods within the farming sector. Despite the potential use of ICTs to reduce the impact of farming upon the environment, the agricultural sector continues to annually release 14% of all greenhouse gas emissions. There appears to be limited prospect of environmental impacts being reduced in the near future, with food production needing to double within the next 30 years to cope with the projected growth in the global population.

Consequently, UN agencies have sought to disrupt this link between increased food production and rises in greenhouse gas emissions through the introduction of e-Agriculture initiatives such as 'ICTs For Small-Scale Farmers'. Such initiatives give farmers more agency to shape the future of global food supply chains. Despite this, there remains a need for a more integrated approach towards using e-

Agriculture to directly address climate change. Effective climate mitigation requires a more concerted effort on behalf of e-Agriculture.

Nonetheless, there have been some recent developments that show the potential impact of e-Agriculture in both the Global North and South. These include portable devices to detect food contamination (Inspecto), used across the food supply chain. Food traceability is now blockchain informed (Wenda), allowing users to track the integrity of food through digital signatures; whilst livestock can now be monitored through the customised use of Internet of Things sensors (Cynomys). As a market, e-Agriculture developments are being produced across a broad range of fields, but with limited coordination or alignment.

Stakeholders at the WSIS 2019 forum discussed how e-Agriculture can benefit a truly broad range of communities in both the Global North and the Global South. However, they failed to properly address what it would take to achieve such goals and progress in a climatically changed environment. Arguably, it would require an integrated and coordinated field of ICT and community participation; communities should be actively engaged in e-Agriculture and take a role in its integration into existing practices, in order to address rising greenhouse gas emissions.

The seeds being sown for the existing crop

The Food and Agriculture Organizations (FAO) e-Agriculture forum currently represents the closest entity to a holistic community initiative. With an estimated membership of 15,000 individuals from 170 countries, agricultural practices are being shaped by the FAO's e-Agriculture Community of Practice. The Community of Practice comprises of people who share interests around the agricultural sector, intending to use these technical networks to facilitate change.

The e-Agriculture Community of Practice specifically seeks to be a hub for information, ideas and resource exchange for sustainable agriculture. For example, it has produced initiatives that enable farmers and breeders to access information surrounding market prices of their livestock and crops. Nonetheless,

the online forums are not collaborating in order to address issues relating to the future sustainability and equity of these initiatives. Therefore, FAO should prioritise the coordination of these forums in order to address these issues, rather than radically alter its operations.

A change of crop needed

Whilst FAO and ITU claim to be centred on sustainable agriculture, this does not mean they are promoting universal sustainability. They interpret sustainability in terms of empowering marginalised communities and sustained crop yields, rather than ensuring climate-smart crops are being developed (those that don't contribute to greenhouse gas emissions or have lower emission). This is not entirely a surprise given that improving crop yields and empowering communities have historically driven e-Agriculture discourse since its conception.

There is a distinct absence in terms of integrated technological solutions to the current risks in the agricultural sector. The risks climate change pose to traditional agriculture practices, together with the impact farming has on greenhouse gas emissions, should be afforded more attention. It is important for e-Agriculture to start sharing the equity of dialogue. Policymakers need to proactively reacts to the threat of climate change and ensure climate supporting technologies and methods are at the forefront of the sector.

Future of e-Agriculture

Future endeavours to mitigate climate change will require the reconfiguring of the e-Agriculture sector. It is crucial that information created by the FAO community of practice is used and that climate is at least factored into any new technologically driven practices in the agriculture sector within the next few years. The Director of the FAO's Climate and Environment Division acknowledged this in March 2019, stating that 'there is an urgent need to scale up climate smart agricultural investments worldwide'. Multiple stakeholders attending the WSIS 2019 e-Agriculture panels, argued for a combined approach to information dissemination. Professor Athula Ginige (University of Western Sydney) argued that whilst innovations were great, 'the bigger problems of climate change weren't being solved', and the greater

agricultural crisis was being overshadowed. The shortcomings of policy derive from the inconsistency between methods that are sustainable, and those that empower.

It is important to note that *homogenous action* does not address the diverse issues experienced by farmers globally (SDSN, 2013). Context specific strategies and solutions are integral to reducing the negative environmental impacts of farming. Nonetheless, *homogenous strategy*, that proactively bases climate-action at the centre of practices, would facilitate an effective effort to adapt to developing risks. Transforming practices so that food systems achieve greater resilience to climate change is essential.

An integrated approach to this would involve combining social empowerment, economic value from crop yields and environmental responsibility. For example, farmers could be empowered to produce climate-smart crops, generating potential wealth for themselves and their communities. This situates the approach in such a way that neglects neither the social aspect e-Agriculture engages with, or the responsibility e-Agriculture has in climate adaptation/ mitigation.

e-Agriculture is transforming Latin American farming through a climate smart approach. With carbon reducing methods in place, data is passively being captured by sensors to alleviate low data availability. This allows the automatization of carbon sequestration analysis. Thus, instead of gathering information relevant only to the efficiency of crop yields, farmers can use metrics to understand and work to improve their carbon footprint. Moreover, examples of climate smart e-Agriculture approaches can be found in Rwanda. Meteo Rwanda gather data on changing weather patterns and the environment; they subsequently work with local stakeholder 'ICT Chamber' to integrate GIS analysis of precipitation and water volumes. These can then be used to inform future climate dependant decisions made by farmers such as crop type or volume. Examples such as these demonstrate how an integrated approach to improving crop yields and efficiency can also help address issues relating to climate change.

Therefore, the coordination of future technologies will help improve the agency of farmers, as well as their capacity to protect themselves from the risks posed by climate change. Smallholder farmers are able to embed climate smart farming methods and technologies into their practices; reducing their exposure to climatic transformation.

Conclusion

The online Community of Practice for e-Agriculture undoubtedly helps bridge the spatial divides geographical locations create. Rapid sharing of practical information across sectors allows adaptation in an efficient way. However, it is imperative that the research effort within e-Agriculture and policies are more effectively focused. In conjunction with current global risks, the Community of Practice should interconnect food security, economic stability and a growing understanding of climate pressures, so that the discourse reflects the multiple social, economic and environmental challenges.

If policy begins addressing the environment and sustainable futures within its foundations, technologies produced will have a guiding framework that direct towards climate justice. Incentivising actions that encourage environmental sustainability will be pivotal to future development in the sector. If e-Agriculture bodies such as the FAO start to demonstrate how environmental considerations can be factored into the adoption of technological innovations in the sector, they can consequently begin to utilise the potential of the sector to build long term capacity. To do so, will require a holistic framework that addresses the existential crisis posed to the sector by agricultural methods that contribute to climate change.

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