

# Food Security Concerns: Roadmap from A G20 Perspective

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*Abstract:* Food security is highlighted as an immediate concern for humanity, with further threats being added with climate change that has the potential to severely disrupt the existing food system. The digitalisation of agriculture is described as a way out of this impasse. The paper argues that small and marginal farmers face a challenge because they are mostly engaged in production with no linkage with the other components of the agricultural value chain, like processing, marketing or even input procurement. They also remain on the wrong side of the digital divide. It is necessary that they are provided with the digitalisation benefits as a public good through effectively chosen public investments. Moreover, it is imperative to provide them with the required capacity building initiatives so that they can use the benefits of the technology in an efficient manner. The G20 is the right forum to bring these issues forward from a global perspective.

*Keywords:* Small and Marginal Farmers, Food Security, Digitalisation of agriculture, Digital Divide.

## Introduction

**H**umans are the only living species on earth engaged in production. We are not accustomed to consuming only the resources available directly from nature. We have developed the knowledge and skill – or, more precisely, the technology – to convert those resources into goods and services that are not available in nature. Of course, we use natural resources, but we also use our labour force and other

produced inputs to create them. This unique capacity to produce has been the distinctive feature that differentiates us from other living beings. The rest of the living species consume only resources that are directly available from nature. Incidentally, this distinctive feature is linked to our accepted path of development. The more we have learned to produce through the transformation of natural resources, the more we have taken the higher paths of development

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and have progressed steadily. But in this process, we have also dumped pollutants on Mother Earth without caring for years. In the process of producing the products we need, we have also produced by-products that we do not need. They have been thrown into nature and are mostly produced by unnatural processes that cannot be broken down into natural resources to be absorbed by the earth's system in a short time. Thus, we have significantly degraded the quality of soil, water and air and it is becoming increasingly difficult to use these natural resources in their purest form.

On the other hand, in our quest in our quest to utilise our capacity to produce, we also got engaged in using natural resources beyond their natural rates of availability. Forests were cut to provide land for agriculture and then for industrial activities along with necessary urbanisation. This led to severe loss in biodiversity without often realising the importance of the losing species in the ecosystem that we live in. The predominance of capture fisheries across the globe has created a grave situation of over-exploitation of marine species. Water crisis are often considered to trigger the next bout of conflicts facing the human species in a few decades from now. Climate change is already a reality and we are yet to find an agreeable solution to this global problem.

An immediate threat from this complex process of destruction of our natural resource base on the one hand and environmental pollution on the other arises in the form of increasing food insecurity for the global society.

It is being noted that the threat of climate change and the consequent rise in temperature will reduce agricultural productivity around the world – especially in tropical regions. Increasing uncertainties associated with excessive rainfall will also have a considerable impact on the availability of agricultural products. Other natural disasters like cyclones, floods and droughts will further exacerbate food insecurity. Earlier drivers of food insecurity in the form of economic shocks and regional conflicts still exist. Of late, a new driver has meaningfully been added in terms of weather extremes. The recently published Global Report on Food Crisis estimates that 128.93 million people are facing food crises, another 24.13 million people are in emergency situations while 0.13 million people face catastrophe<sup>1</sup>. The report explains the role of each of these drivers in accentuating food insecurity and it is important to note that the number of countries facing insecurities due to climate change has risen from 8 in 2021 to 12 in just a year. The number of vulnerable people has more than doubled from 23.5 million to 56.8 million in the same period. The impact of climate change on increasing global food insecurity can no longer be ignored.

One very enthusiastic solution that is doing the rounds is of digitalising agriculture through the extensive use of information and communication technology and big data to create new software solutions for mass storage and optimised connectivity, block chain technology to monitor the supply chain more precisely and the use of drones,

Internet of Things (IoT) and sensors that would ensure farmers are capable of monitoring production more efficiently<sup>2</sup>. A number of studies have been carried out to identify the positive roles of digitalisation. McFadden (2022) is a recent and detailed review of the existing literature from the agricultural sector in OECD countries. However, as rightly highlighted in a T20 policy brief (Anbumozhi *et al*, 2022), the digital divide that exists between developed and developing countries calls for improved global governance architecture for the agricultural sector. This paper proposes a possible framework of governance architecture for the global agricultural sector that can be accessible and inclusive for all farmers, regardless of farm size, to ensure food security for all in the spirit of equity.

## **The Present State of Global Agriculture and Food Security**

The global agricultural system is engaged in producing food for billions of people and sustaining the livestock industry. Demands from both these sectors are increasing steadily. Further, it is also getting increasingly engaged in the production of energy through biofuels, leading to what is described as a food-feed-fuel crisis (Muscat *et al*, 2020). It also has to take care of the demands for inputs from the manufacturing sector. It is obvious that this is a complex systemic problem and a simple linear solution is difficult to find. In addition, the system needs to be purposefully linked to the available land and water resources which are also put to diverse,

sometimes conflicting, uses. However, in this discussion, we shall consider the largest and the most important part of the global agricultural system – the food system. Effective measures to take care of governance of the agricultural system as a whole that includes both food and non-food agricultural products, cannot be thought of in the presence of increasing food insecurity.

What is the main problem of the global food system today? There is no reason to disagree with the argument put forward recently by George Monbiot that “our food systems (are) on the verge of collapse”<sup>3</sup>. The global food system is also gradually being conquered by the plutocrats, and to a significant extent through the process of digitalisation of agriculture. Before going into the details of the implications of digitalisation in its present format, it is important to look at the following information:

- There are more than 608 million farms in the world.
- Family farms produce roughly 80 per cent of the world’s food in value terms.
- 72 per cent of global farms are smaller than one hectare in size; 12 per cent are 1–2 ha in size; and 10 per cent are between 2 and 5 ha. Only 6 per cent of the world’s farms are larger than 5 ha.
- Farms smaller than 2 hectares produce roughly 35 per cent of the world’s food.
- The largest 1 per cent of farms in the world (those larger than 50 ha) operate more than 70 per cent of the world’s farmland. (Lowder *et al* 2021)
- Prevalence of undernourishment started increasing in 2017 (7.6 per

cent) and reached 9.8 per cent in 2021 (FAOSTAT). 11.7 per cent of the global population suffered from severe food insecurity in 2021 compared to 7.7 per cent in 2014 (FAOSTAT).

- Today, more than 800 million people across the globe go to bed hungry every night, most of them smallholder farmers who depend on agriculture to make a living and feed their families. Despite an explosion in the growth of urban slums over the last decade, nearly 75 per cent of poor people in developing countries live in rural areas. Growth in the agriculture sector - from farm to fork - has been shown to be at least twice as effective in reducing poverty as growth in other sectors<sup>4</sup> (USAID).
- The risk and responsibility these farmers face on a daily basis are not matched by the financial, institutional, technical and technological support they need to thrive. It can be argued that food insecurity cannot be tackled if these supports are not provided.
- Climate change is an added complication faced by them. It can affect crops, livestock, soil and water resources, rural communities, and agricultural workers. However, the agriculture sector also emits greenhouse gases into the atmosphere that contribute to climate change (USEPA)<sup>5</sup>.
- A recent IMF study (Rother *et al*, 2022) clearly argues that food insecurity is a global phenomenon but affects low-income countries the most.

The call for the digitalisation of agriculture has to be looked into against the backdrop of these important realities. Are the big number of small and marginal<sup>6</sup> farmers capable of digitalising their agricultural practices on their own? Most probably, they are not. They would require ample institutional, technological and financial support to arrange a solution that would be built on their ability to organise themselves in taking such steps forward.

## **Digitalisation of Agriculture and Its Implications**

The digitalisation of agriculture has been going on for quite some time, ever since the geographical positioning system was used in agricultural decision-making at the beginning of this century. The use of digital technologies in the management of agricultural production and processing, followed by marketing efforts to reach the end consumer, has become more extensive during the last two decades. These actions have been found to have reduced costs and made the activities efficient. They are also claimed to have become more environmentally conscious, contributing to climate-friendly agriculture.

However, it is necessary to note that the process has become too intensive in terms of access to capital – be it in physical or in knowledge nature. The digitalisation of agriculture is primarily built on the idea of involving the recent advances in communications and related technologies that would, in all perspectives, substitute the labour-intensive methods used

by small farmers across the globe. In reality, in a typical digitally managed agricultural system, the farms would benefit in different ways from digital technologies in relation to their size. The bigger-sized farms would be able to digitalize their system faster than the small and medium ones simply because they have easier access to physical capital and knowledge. The existing digital divide will also play an effective role in putting small farmers on the receiving end. Traditional farmers have been using their skills in agricultural production for generations and often could not upgrade their skills in other domains as most of them could not afford to join the other components of the value chain, like processing and marketing in the forward linkages or input procurement in the backward linkages. They just produced with no opportunities to gain a share of the surplus generated in the other components of the agricultural value chain. To emphasise, the surplus generated by small and marginal farmers is often zero, if not negative. This is the effect of disguised unemployment that Joan Robinson pointed out as early as 1936. The curse of disguised unemployment affects small and medium farmers today, as Liboreiro (2022) notes, even in middle-income countries such as Brazil, China, Indonesia, India, Russia, Mexico and Turkey. A study by ILO finds in Indonesia and South Africa that individuals who start their careers at the bottom of the transition ladder (i.e., in informal work, the agriculture sector or a low-skill occupation) are less likely

to move out of their present situation (Brehm *et al*, 2023).

The status of small farmers in low-income countries is quite understandable. For example, Herrera *et al* (2021) report on the situation in Madagascar where over 70 per cent of respondents reported not having enough food for the household in the last three years, and the most frequently reported cause was small land size (57 per cent). In Cambodia, small-size farmers – who make up three-quarters of the country’s 1.7 million farming households – struggle to achieve the size and consistent quality of production needed by export and domestic markets. Most supplement their incomes with non-farm wage labour<sup>7</sup>. Niragira *et al* (2015) argue in the same vein to describe the status of small farmers from Burundi. They note that the predominant production systems in the poorest areas are still characterised by low input use, mixed cropping, and keeping a small number of livestock, with a high degree of reliance on their own production to provide their food. The situation is further grim in countries such as Afghanistan, Syria, the Democratic Republic of the Congo and Yemen, which are facing violent domestic violence (Kemmerling *et al*, 2023).

What will be the roadmap for the future? It is clear that the governance of global agriculture is at an interesting crossroads. On the one hand, small farmers still provide almost 35 per cent of global food grains, controlling just 24 per cent of the agricultural land, but they are in dire straits to maintain their

existence. On the other hand, the largest 1 per cent of farmers control 70 per cent of the global farmland with a size of 50 hectares or more and produce around 37 per cent of the global food supply<sup>8</sup>.

### **New Global Governance Framework for Agriculture: G20 Perspective**

If digitalisation of agriculture is considered the way out to take care of the impending food insecurity, we have to develop a governance structure that will not only take care of the resilience of the global food system but also ensure that the small farmers across the globe join the process in a meaningful way. The roadmap so far has been developed in the context of the supply of different technological applications that can facilitate the process. However, not enough efforts have been made to look into the accessibility of these innovative applications to small farmers. They cannot access them individually, given their financial, institutional and technical capabilities. It is necessary that they are provided with these services in a collective manner.

The G20 has been a useful group to look for new governance approaches to sustainable development. Starting with the Presidency of Indonesia in 2022, it will be led by Southern countries until 2026. India will hand over the baton to Brazil in 2024 to be subsequently passed on to South Africa in 2025. This is the most opportune moment for taking up critical issues faced by small and marginal farmers who are mostly found

in Southern countries where agriculture still contributes as a major source of employment<sup>9</sup>, if not GDP<sup>10</sup>. One such important issue is related to the digitalisation of agriculture that would help these farmers to not only monitor and control their production using emerging technologies but also join the other components of the value chain so far inaccessible to them, like processing, storage, transportation and marketing. It is observed that the use of new technologies is creating an opportunity to link up all components of the value chain to increase the overall efficiency of the system. Therefore, small farmers who are traditionally only involved in production cannot achieve efficiency if they are left out from the other related components of the value chain. They need to have seamless access to credit, real-time information on the availability of inputs, storage and transport systems, processing facilities and finally, information about marketing of their final products. Keeping in mind the growing concern about climate change, they also need to be made aware of the ecological and environmental implications of existing practices. It is to be noted that given the technological changes brought about by the introduction in the 1960s of practices centred around the use of high yielding varieties of seeds along with uncontrolled use of water, fertilizers, herbicides and pesticides, the small farmers also shifted from their traditional, nature-based farming methods. Such a step increased the productivity of food systems. However, the resulting negative

impact on the environment and ecology has long-term consequences.

Three basic steps need to be considered. First, small farmers need to have collective access to these facilities and States are to facilitate this process through public investments. It is obvious that the farmers operating at low scales are at institutional, technical and financial disadvantages to digitalise their agricultural practices as individual entities. It is necessary that digitalisation is introduced as public goods to be shared by the cohort of farmers jointly. Second, it is important to provide them with the necessary capacity building arrangements to effectively use these technical inputs. State initiated efforts are necessary to meet this requirement as small and marginal farmers are found to be mostly on the wrong side of the prevailing digital divide because they cannot take care of this divide as individual entities. Thirdly, small and marginal farmers need to be empowered to take a decision-making position not only in processing and marketing the products they want to pass on to the final consumers but also in procuring the necessary inputs. As per the existing system, most of them are either engaged in production for their own household consumption or selling their excess production to middlemen at farm gates. They also procure their inputs from a set of middlemen. As a consequence, they create values but fail to realise the same, as a considerable part is usurped by the middlemen. If they are collectivised in procuring inputs or processing and marketing their outputs,

they can realise a larger part of the normal surplus they generate. Examples of many such successful collectivisation processes exist across the world (Dumitru *et al*, 2023; Alizadehnia *et al*, 2022; Alotaibi *et al*, 2022; Fischer *et al*, 2012; Georg, 2020; Khan *et al*, 2022; Liang, 2018; Miron-Sanguino, 2022; Ruben, 2012; Vlachos, 2022). They can provide good inputs in framing the policy perspectives.

A G20 mechanism under the continued leadership of the countries of the South can help in the coming years to create such an effective governance structure for a global food system that becomes resilient and sustainable and helps us all to address the prospects of food insecurity that we are currently concerned about.

## Endnotes

- <sup>1</sup> <https://www.ipcinfo.org/>, <https://www.fsinplatform.org/global-report-food-crises-2023>
- <sup>2</sup> <https://varda.ag/blog/14-blog/trends-and-topics/49-agriculture-digitalization>
- <sup>3</sup> <https://www.theguardian.com/commentisfree/2023/jul/15/food-systems-collapse-plutocrats-life-on-earth-climate-breakdown>
- <sup>4</sup> <https://www.usaid.gov/agriculture-and-food-security>
- <sup>5</sup> <https://climatechange.chicago.gov/climate-impacts/climate-impacts-agriculture-and-food-supply>
- <sup>6</sup> Marginal farmers are considered only in terms of their size of holdings. This does not have any implications on their efficiency.
- <sup>7</sup> <https://www.ifad.org/en/web/latest/-/ifad-and-kingdom-of-cambodia-sign-agreement-to-promote-inclusive-and-sustainable-agricultural-growth>
- <sup>8</sup> <https://ourworldindata.org/smallholder-food-production>

<sup>9</sup> <https://data.worldbank.org/indicator/SL.AGR.EMPL.ZS>

<sup>10</sup> <https://ourworldindata.org/grapher/agriculture-share-gdp>

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