

### Topic A: Increasing Agricultural Production in Cities

#### Introduction

Cities have surpassed rural areas as home for the majority of the world's population.<sup>1</sup> Without careful planning and investment, cities can be dense, chaotic, expensive and unhealthy places to live. Traditionally, large urban populations have been sustained by agricultural production in the hinterland. Rural areas were places of food *production*, while cities were places of food *consumption*. While new agricultural practices and technology have increased crop yields in rural farming over time, the reality for urban dwellers – particularly lower-income residents – is often lack of access to fresh, healthy food.<sup>2</sup> This is particularly the case in developing countries where rural agriculture is often focused on commercial crops for export. Less land in cultivation for the diverse food items needed for healthy nutrition means higher prices for already strained household food budgets. While rural residents can often grow their own food to offset high prices, urban residents usually cannot. Furthermore, while many city dwellers could often rely on relatives in rural areas to provide produce to supplement their diets, urban population growth has outpaced the ability of such arrangements to keep up. As a result, lower-income city residents are paying more for lower-quality food and are often at risk of food insecurity and malnutrition.<sup>3</sup> Sustainable Development Goal 2 calls for “zero hunger” by 2030.<sup>4</sup>

One way of addressing this imbalance is to view cities not only as places of consumption, but places of production as well. The past couple of decades has shown increased interest in urban and peri-urban agriculture (UPA).<sup>5</sup> An oft-cited definition of urban agriculture is as follows:

“Urban agriculture is located within (intra-urban) or on the fringe (peri-urban) of a town, a city or a metropolis, and grows or raises, processes and distributes a diversity of food and non-food products, (re-) uses largely human and material resources, products and services found in and around that urban area, and in turn supplies human and material resources, products and services largely to that urban area.”<sup>6</sup>

Thus, UPA is food production in cities, by city dwellers and for city dwellers. In practice, urban agriculture can take a variety of forms – rooftop gardens, vertical farming, community gardens, hydroponics and micro-livestock raising.<sup>7</sup> (Figure 1)<sup>8</sup>

**Figure 1: Examples of Urban Agriculture**



Rooftop Farming in New York

Vertical Farming in Milan, Italy

The promise of urban agriculture is manifold. First, urban gardening and crop production can help lower-income urban families have access to fresher and more nutritious food items, reducing malnutrition and food insecurity.<sup>9</sup> This produce can help reduce household expenditures as well and surplus can be sold or traded to supplement household income.<sup>10</sup> In addition, urban agriculture increases the proportion of green spaces in cities, in turn helping to reduce the size of urban heat traps and removing carbon from the local atmosphere.<sup>11</sup> Finally, the presence of greener spaces and more pleasant surroundings can have a positive impact on mental health and wellness.<sup>12</sup>

### Current Situation

FAO was officially mandated to work on UPA in the late 1990s. The FAO began to intensively examine UPA as a strategy to combat urban hunger and address sustainability in rapidly growing cities.<sup>13</sup> In 2008, this early work resulted in the *Growing Greener Cities Programme* – a six-year effort to assist member states in implementing UPA.<sup>14</sup> In 2019, the FAO established its *Urban Food Agenda*<sup>15</sup> with the goal “to transform urban food systems to make them more sustainable and improve nutrition by working with sub-national and local governments.”<sup>16</sup> The following year, UPA was rolled into FAO’s *Green Cities Initiative*.<sup>17</sup>

The most recent FAO study of UPA best practices was conducted in 2022.<sup>18</sup> The study looked at case studies from six cities around the world, identifying strategies that seemed to increase the effectiveness of urban agriculture.<sup>19</sup> Some of the most important strategies derived from the case studies are summarized in the sidebar.<sup>20</sup> Overall, the findings seem to indicate the importance of identifying and preserving urban land for agricultural use, and being able to scale-up UPA to significantly contribute to urban food systems.

Like all other approaches to meeting the SDG goals, the expansion of UPA will require significant commitment and investment – particularly in countries where rapidly growing cities have outpaced the capacity of governments to provide the necessary levels of planning and resources. The needs of the Global North and South are quite different in this regard<sup>21</sup> and it can be expected that urban areas in lower-income countries (where the need is greater and the resources less) will require significant assistance.<sup>22</sup>

### Effective Urban Agriculture Strategies

1. Urban planning that designates spaces within the city for agricultural use
2. Use of vacant land for agriculture – private owners could be compensated through tax credits
3. Create policies for off-plot production and regulate its use
4. Ensure that water resources meet the needs of agricultural uses through policy and irrigation projects
5. Increase access to capital for urban residents and small businesses to begin or scale-up production
6. Create funds to buy-out private land to create community gardens
7. Incorporate gardens into primary and secondary education to increase knowledge of food systems
8. Provide and fund demonstration plots and pilot programs to transmit best practices

### Questions to Address

- How can FAO best promote UPA's inclusion in all UN urban policy programs?
- What actions can FAO take to help urban farmers sustain profitable agricultural production?
- How can FAO help cities preserve land for agricultural uses?

### Topic B: The Opportunities and Challenges of Genetically Modified Foods

#### Introduction

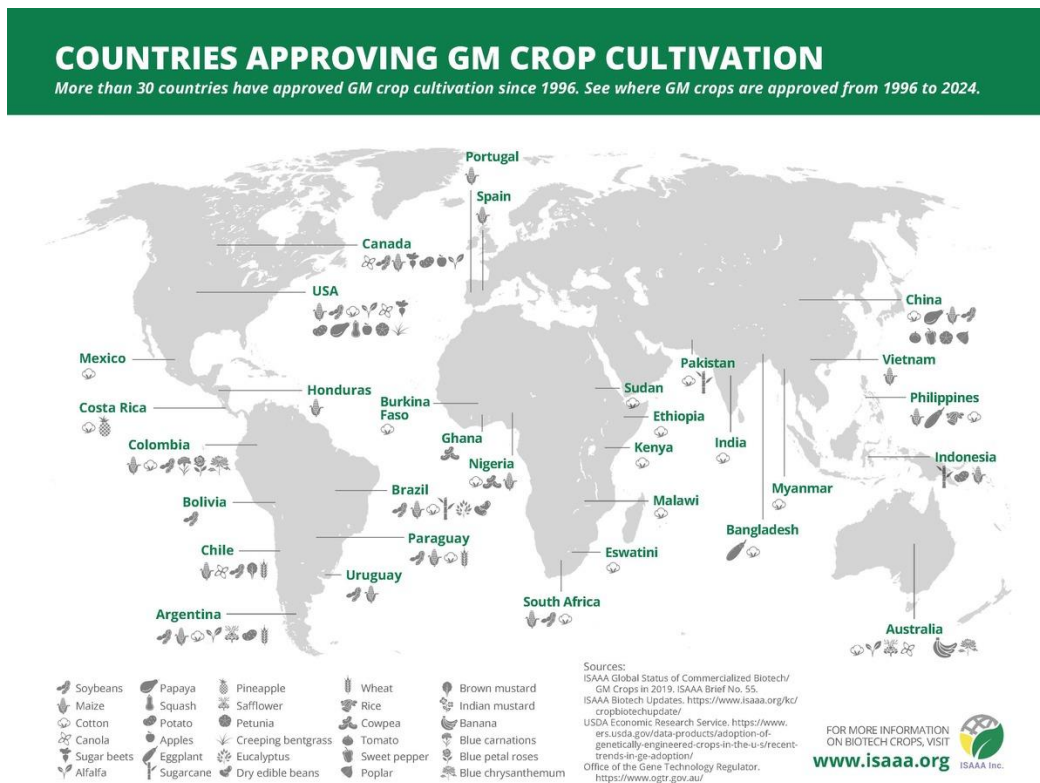
Humanity has been genetically altering food crops since ancient times. The selective cultivation of more productive and nutritious plants and animals began with the birth of agriculture and has resulted in increasing yields able to support greater populations. In the modern context, however, people tend to think of genetically modified foods (GMF) as those in which biotechnologies have been used to manipulate genetic material directly, rather than through selective breeding or cultivation. The World Health Organization (WHO) defines GMFs as:

“...organisms (i.e. plants, animals or microorganisms) in which the genetic material (DNA) has been altered in a way that does not occur naturally by mating and/or natural recombination. The technology is often called “modern biotechnology” or “gene technology”, sometimes also “recombinant DNA technology” or “genetic engineering”. It allows selected individual genes to be transferred from one organism into another, also between nonrelated species. Foods produced from or using GM organisms are often referred to as GM foods.”<sup>23</sup>

GMFs can increase yields by making crops more productive and by providing them with resistance from pests and diseases. For some, GMFs are the answer to meeting SDG 2 of ending hunger. Nevertheless, these genetically modified crops have also raised a number of concerns which have slowed their adoption. (Figure 2.)<sup>24</sup>

The first concern relates to the effects of GMFs on human health. Some claim that genetic alterations of food may lead to unintentional negative health outcomes and that not enough research has been done to claim they are safe for human consumption.<sup>25</sup> A second set of concerns revolves around the environmental impacts of GMFs. As new strains of plants and animals reproduce and intermingle with natural environments, some are worried they can disrupt and destroy important ecosystems or risk creating monocultures.<sup>26</sup> Third, some are concerned with ethical issues and wonder if tampering with an organism's DNA is causing harm. Finally, some are concerned with the role of corporations in the development and use of these GMFs. New seed varieties are patented by the companies that produce them and farmers can be restricted from certain uses and often must pay higher prices.<sup>27</sup> As the 2030 goal of zero hunger approaches, it is worthwhile to consider whether GMFs should be a greater part of the FAO's strategy.

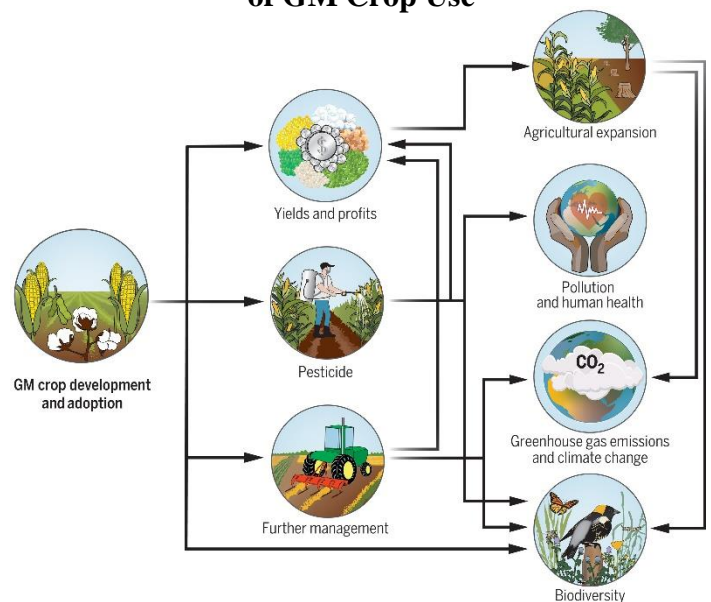
Figure 2



**Current Situation**

There is great debate over whether the perception of GMFs as harmful to human health and the environment is actually true. Some recent studies point to a lack of any verifiable health or environmental impacts tied directly to GMFs.<sup>28</sup> Others insist that GMFs have negative impacts on the environment through both direct and indirect means (e.g., increasing use of pesticides and less sustainable cropping and tillage patterns).<sup>29</sup> (Figure 3.) Others believe that GM crops are the only way to help farmers in poor regions like Sub-Saharan Africa to meet their food requirements in the long term.<sup>30</sup> Many acknowledge that acceptance of GMFs is hindered by the monopolistic and predatory behavior of some biotech companies.<sup>31</sup> The

**Figure 3: Potential Environmental Impacts of GM Crop Use**



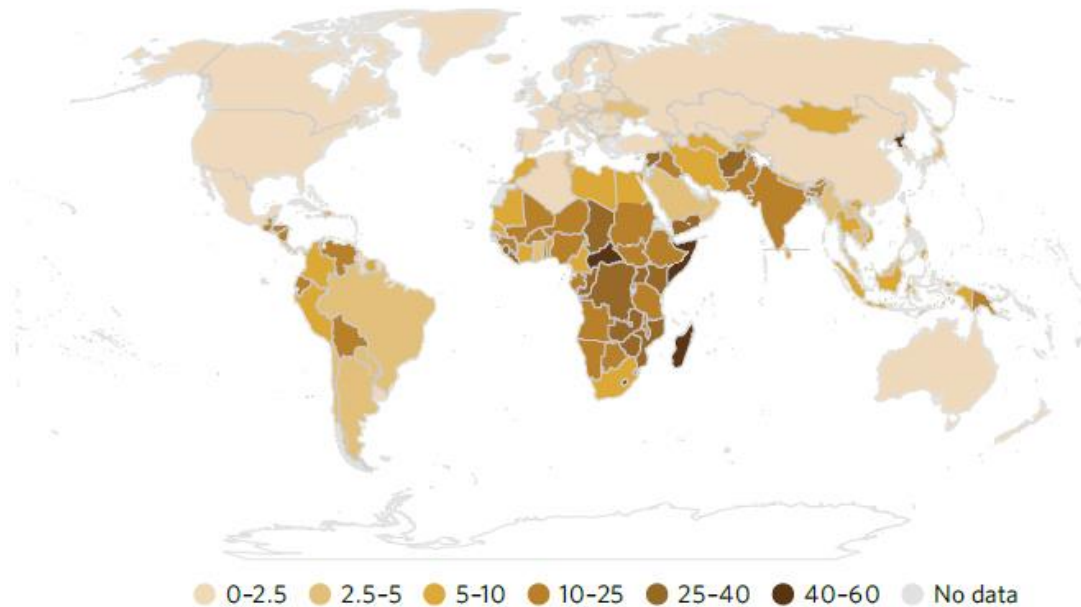


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reality is that the United nations is in danger of missing the target of ending hunger by 2030 as significant regions of the world are still significantly undernourished, particularly in Africa. (Figure 4.)<sup>32</sup>

**Figure 4: Prevalence of Undernourishment, 2020–2022 Average (Percentage)**



Due to disagreements on the ethics and safety of GMFs among member states (particularly between the United States and Europe) the FAO has taken a neutral position on their use.<sup>33</sup> While the FAO recognizes the potential benefits of GM crops, it has no stance for or against their use.<sup>34</sup> FAO does maintain, however, that there is more than enough food capacity *without* GMFs to meet the 2030 target.<sup>35</sup> Recognizing the concerns of member states on the use of GMFs and the need to share information, FAO launched the GM Foods Platform in 2013.<sup>36</sup> The platform is specifically designed “to share information on safety assessments of foods derived from recombinant-DNA (r-DNA) plants.”<sup>37</sup> Although most FAO members have joined the platform, very few of them have actually contributed any safety assessments.<sup>38</sup> One major reason cited for the lack of participation is the lack of capacity in many countries to perform GM food safety assessments.<sup>39</sup> Now that achieving the goal of zero hunger seems increasingly unlikely, it might be time for FAO to develop a more comprehensive and robust policy on the use of GMFs.

### Questions to Address

- Should the FAO actively encourage member states to adopt GMFs in order to end hunger?
- How can FAO better enable member states to implement GM food safety assessments?
- What more can FAO do to determine if GMFs are safe and effective?

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<sup>1</sup> *FAO framework for the Urban Food Agenda: Leveraging sub-national and local government action to ensure sustainable food systems and improved nutrition*. Food and Agriculture Organization of the United Nations, Rome, 2019. <https://doi.org/10.4060/ca3151en>, p.6.

<sup>2</sup> Ibid.

<sup>3</sup> Ibid.

<sup>4</sup> “Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture.” United Nations Department of Economic and Social Affairs. <https://sdgs.un.org/goals/goal2>, Accessed 3 December 2024.

<sup>5</sup> FAO, Rikolto and RUAF. 2022. *Urban and peri-urban agriculture sourcebook – From production to food systems*. Rome, FAO and Rikolto. <https://doi.org/10.4060/cb9722en>, p. 9

<sup>6</sup> Mougeot, L.J.A. 2000. Thematic Paper 1 Urban Agriculture: Definition, Presence and Potentials and Risks. *Growing Cities, Growing Foods: Urban Agriculture on the Policy Agenda*, 1–42

<sup>7</sup> FAO, Rikolto, p. 38

<sup>8</sup> Simos, Nikos. “3 ways to Integrate Agriculture into Architectural Projects”, *Agritecture*, 13 April 2023.

<https://www.agritecture.com/blog/2023/4/13/tips-amp-tricks-for-architects-who-want-to-integrate-agriculture-into-projects> Accessed 1 December 2024.

<sup>9</sup> Ibid, p. 25

<sup>10</sup> Ibid, p. 31

<sup>11</sup> “Green Cities Initiative”, Food and Agriculture Organization of the United Nations, <https://www.fao.org/green-cities-initiative/en/> Accessed 1 December 2024.

<sup>12</sup> Taguchi, Makiko and Guido Santini, “Urban agriculture in the Global North & South: a perspective from FAO”, *Field Actions Science Reports* [Online], Special Issue 20 | 2019, Online since 24 September 2019, connection on 24 November 2021. URL: <http://journals.openedition.org/factsreports/5610>, p. 17

<sup>13</sup> Van Veenhuizen, René and George Danso. “Profitability and sustainability of urban and peri-urban agriculture”, *Agricultural Management, Marketing and Finance Occasional Paper 19*, Food and Agriculture Organization of the United Nations, Rome, 2007, p. v.

<sup>14</sup> FAO, Rikolto, p. 3.

<sup>15</sup> *FAO framework for the Urban Food Agenda*

<sup>16</sup> “About Urban Food Agenda.” Food and Agriculture Organization of the United Nations,

<https://www.fao.org/urban-food-agenda/about/en/> Accessed 1 December 2024.

<sup>17</sup> FAO, Rikolto, p. 34.

<sup>18</sup> Erwin, D. 2022. *Urban and peri-urban agriculture case studies – Overview, conclusions and recommendations. An annex to Urban and peri-urban agriculture – From production to food systems*. Rome, FAO and Leuven, Rikolto. <https://doi.org/10.4060/cb9734en>

<sup>19</sup> Ibid.

<sup>20</sup> Ibid, pp. 37-47.

<sup>21</sup> Taguchi, Makiko.

<sup>22</sup> *FAO framework for the Urban Food Agenda*, p. 24

<sup>23</sup> “Food, genetically modified”, World Health Organization, 1 May 2014, <https://www.who.int/news-room/questions-and-answers/item/food-genetically-modified>, Accessed 10 January 2025.

<sup>24</sup> Tome, Kristine Grace, et al. “Countries Approving GM Crop Cultivation”, ISAAA Inc., 31 October 2024, <https://www.isaaa.org/blog/entry/default.asp?BlogDate=10/31/2024>, Accessed 10 January 2025.

<sup>25</sup> *Genetically modified (GM) crops: Safety, benefits, risks and global status*, Food and Agriculture Organization of the United Nations, Colombo, 2022, pp. 5-6

<sup>26</sup> Ibid, pp. 7-10

<sup>27</sup> “Food, genetically modified”

<sup>28</sup> Goodman, Richard E., Twenty-eight years of GM Food and feed without harm: why not accept them?, *GM Crops & Food*, 15(1): 40-50, 11 January 2024, p. 40

<sup>29</sup> Noack, Frederik, et al., Environmental impacts of genetically modified crops. *Science*, 385(6712): 30 August 2024.

<sup>30</sup> Mmbando, Gideon Sadikiel, The Adoption of Genetically Modified Crops in Africa: the Public’s Current Perception, the Regulatory Obstacles, and Ethical Challenges, *GM Crops & Food*, 16 April 2024

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<sup>31</sup> Wetzels, Hans, "African solutions urgently sought for agricultural revolution: An unprecedented wave of mergers among world's top GMO producers worries regulators", *Africa Renewal*, December 2017-March 2018 <https://www.un.org/africarenewal/magazine/december-2017-march-2018/african-solutions-urgently-sought-agricultural-revolution>, Accessed 10 January 2025.

<sup>32</sup> "Zero Hunger", United Nations Department of Economic and Social Affairs, <https://unstats.un.org/sdgs/report/2023/goal-02/>, Accessed 10 January 2025.

<sup>33</sup> "Frequently Asked Questions about FAO and Agricultural Biotechnology", Food and Agriculture Organization of the United Nations, July 2011, [https://www.fao.org/fileadmin/user\\_upload/biotech/docs/faqsen.pdf](https://www.fao.org/fileadmin/user_upload/biotech/docs/faqsen.pdf), Accessed 10 January 2025, p. 2

<sup>34</sup> Ibid.

<sup>35</sup> Ibid.

<sup>36</sup> *Global community meeting of the FAO GM Foods Platform. Towards effective risk-based GM food safety assessment and regulatory management.* Meeting Report, Food and Agriculture Organization of the United Nations, 2020, p. 1

<sup>37</sup> Ibid.

<sup>38</sup> Ibid.

<sup>39</sup> Ibid.