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YOUNG SCIENTISTS GROUP



OPPORTUNITIES AND BARRIERS FOR ADVANCING AGRIFOOD SYSTEMS

Empowering young people
for a sustainable future





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World Food Forum

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About the World Food Forum

Launched in 2021, the World Food Forum (WFF) is an independent, youth-led global network of partners facilitated and hosted by the Food and Agriculture Organization of the United Nations (FAO). It aims to spark a global movement that empowers young people everywhere to actively transform agrifood systems to help achieve the Sustainable Development Goals and a better food future for all.

The WFF serves as the premier global forum to harness the passion and power of youth to identify solutions and incite positive action for agrifood systems. It aligns with the 2021 United Nations (UN) Food Systems Summit, acts as major youth platform in global food governance, and serves as a global think tank that fosters youth-led solutions in innovation, science and technology. The WFF aims to support and grow youth initiatives in the agrifood sector in line with global youth policy recommendations, focusing in 2023 on the theme, "Agrifood systems transformation accelerates climate action."

To drive awareness, foster engagement and advocacy, and mobilize resources, the WFF connects youth groups, influencers, companies, academic institutions, nonprofits, governments, media and the public.

It features a range of interactive events, networks and content platforms organized around four thematic tracks: Youth Action, Innovation, Education and Culture.

Every October, the WFF culminates in a week-long flagship event, encompassing the WFF Global Youth Forum, the FAO Hand-in-Hand Investment Forum and the FAO Science and Innovation Forum. These very diverse yet interlinked fora foster an intergenerational dialogue and debate among relevant stakeholders, including young and youthful participants, farmers, small-scale producers, Indigenous Peoples, policymakers, agri-investors and scientists.

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Abbreviations and acronyms

AIS	Agricultural Innovation System
CAAS	Chinese Academy of Agricultural Sciences
CAP	EU Common Agricultural Policy
CFS	Committee on World Food Security
COVID-19	novel coronavirus
CTA	Technical Centre for Agricultural and Rural Cooperation
FAO	Food and Agriculture Organization of the United Nations
HFSA	Healthy Food Systems Australia
IFAD	International Fund for Agricultural Development
IUA	Institute of Urban Agriculture
OECD	Organization for Economic Co-operation and Development
R&D	Research and development
SDGs	Sustainable Development Goals
SRWWG	Scientific Report Writing Working Group
UNFSS	United Nations Food Systems Summit
UNYFA	Young Farmers' Federation of Uganda
WFF	World Food Forum
YPARD	Young Professionals for Agricultural Development
YSG	World Food Forum Young Scientists Group

Abstract

Agrifood systems are facing increasing shocks and stresses, which puts them under immense pressure. It is crucial to recognize that these systems must prioritize more than just food production and cannot separate factors such as food processing and distribution, if they aim to maximize nutrition fulfillment for all. However, these assumptions raise the question of whether we can produce efficiently to meet rising global demand while protecting the environment and communities inclusively and more sustainably. To achieve this, it is necessary to adopt practices that can make agriculture and forestry more efficient under limited availability of natural resources. The key challenge now is to transform current agrifood systems into more resilient, sustainable, equitable and accessible systems for all. This transformation will require a collective effort from various stakeholders, but it is essential to identify and support the main drivers of this transformation.

Youth – including diverse groups such as rural youth, Indigenous youth, young women, among others – play a crucial role in strengthening inclusive policy environments for driving sustainable and resilient agrifood systems. The first cohort of the Young Scientists Group (YSG) has highlighted four key enablers of youth empowerment: education, technology, science and policy. In the following report, the YSG examines these four enablers alongside five case studies and an interview, highlighting best practices and critical issues that need to be resolved immediately to achieve more sustainable agrifood systems. As the report explains, youth are better positioned as drivers and agents of change by advancing these four enablers, especially given their willingness to take risks and adopt new ideas.

Executive Summary

Chapter 1 gives an **overview of the latest issues affecting agrifood systems**, which include increasing pressure to produce sufficient food for the growing global population while meeting environmental, nutritional, economic and social goals; worsening inequities in agrifood systems, including access to affordable healthy diets and various shocks and stresses that disproportionately affect marginal farmers; the misalignment of production volumes with nutritional needs; food loss and waste; limited natural resources in crop production; corporate domination of global food production; and a lack of concrete political and financial support from governments to sustainably transform agrifood systems.

Chapter 2 focuses on the **challenges faced by youth who are working to advance sustainable agrifood systems**, with attention to how these challenges affect youth differently based on their geographical location, sex, ethnicity, culture and many other factors. Specifically, this chapter explains three key challenges affecting youth engagement in agrifood systems: 1) limited or lack of access to productive resources, services and markets, including land, quality financial services and suitable training opportunities; 2) negative perceptions and limited attractiveness of the agrifood sector and agrifood employment; and 3) limited meaningful engagement in policy processes.

Chapter 3 identifies and explores four **key enablers of youth empowerment** 1) education, 2) technology, 3) science and 4) policy. It shows how and why these four enablers must co-evolve to facilitate youth-driven transformation of agrifood systems and gives recommendations on how to leverage these four enablers to empower youth.

Chapter 4 highlights **existing youth-based initiatives for improving agrifood systems**. This chapter presents five case studies and an interview: 1) the story of the Young Farmers' Federation of Uganda, 2) the story of Elixir Foods in Brazil, 3) the story of the Institute of Urban Agriculture in China, 4) the story of youth engagement in the 2021 United Nations Food Systems Summit, 5) the Story of Healthy Food Systems Australia, and 6) an interview with Indigenous youth advocate Makanalani Gomes on ensuring the meaningful engagement of Indigenous young people.

Chapter 5 provides the **conclusions and recommendations** of the report. It demonstrates that empowering young people can create sustainable agricultural systems, improve food security, and address poverty in rural communities. It also reiterates the crucial role of policymakers, investors and stakeholders to continue supporting and investing in initiatives that ensure youth are at the forefront of transforming agrifood systems. The chapter closes with **18 science-based and action-oriented recommendations** divided into five categories.

Eighteen Recommendations

Better Production: 1) Promote more responsible and sustainable production. 2) Increase awareness about urgent production issues. 3) Encourage continuous education and training paths. 4) Improve young entrepreneurs' access to farm credit, improved seeds and extension services.

Better Nutrition: 5) Support nutrition policies across all areas of government. 6) Redesign food environments for better nutrition. 7) Generate positive narratives on healthy diets in sustainable agrifood systems.

Better Environment: 8) Scale up climate-smart and sustainable environmental practices. 9) leverage holistic Indigenous knowledge systems. 10) Better integrate agriculture and related disciplines into education.

Better Life: 11) Create opportunities for youth. 12) Create better conditions for human capital. 13) Make agricultural policies more gender inclusive.

Call for action: 14) Enhance opportunities for funding and investment in science and technology. 15) Connect young scientists to international organizations at all global, regional and country levels. 16) Support mentorship and career development for young scientists to engage in the agrifood systems. 17) Establish a networking platform for young scientists for information and knowledge exchange, crafting a young scientist story from the lab to the field. 18) Strengthen policy dialogue and create permanent seats on the policy table for young scientists at different scales of policymaking around the globe.



Chapter 1.

Overview of the latest issues affecting agrifood systems

Current agrifood systems face the challenge of adapting to dynamic changes in factors such as population, resources and markets. As a result, they require transformation towards inclusivity, sustainability, and resilience to meet present and future challenges. Young people can play a key role in this transformation. Furthermore, young people have high stakes in the processes that enable or advance change for the protection of people and the planet, since they will experience the effects of today's actions (or inaction) on agrifood systems well into the future.

Agrifood systems encompass a range of interconnected activities linking individuals to their food, originating from agricultural and non-agricultural sources. These activities may include food production, processing, distribution and consumption, all of which are intricately linked through complex social, cultural, ecological and economic relationships. Agrifood systems also encompass the entire range of actors, and their interlinked value-adding activities, engaged in the primary production of food and non-food agricultural products, as well as in storage, aggregation, post-harvest handling, transportation, processing, distribution, marketing, disposal and consumption of all food products including those of non-agricultural origin (FAO, 2021a).

However, our agrifood systems are under increasing pressure to produce sufficient food for the global population while also meeting environmental, nutritional, economic and social goals. According to estimates given by the World Resources Institute (WRI, 2019), we will need to produce around 60 percent more food to feed a world population of almost 10 billion by 2050. Increasing human population, along with higher living standards, has greatly affected the environment, especially the ecosystems that support both human and other life forms. There is more pressure on natural resources like land, rivers, oceans and forests than in the past.

Climate change – with its associated severe weather, droughts, pests and diseases – is one of our greatest global challenges and it continuously affects how, where and for whom we produce our food.

In addition, the coronavirus (COVID-19) pandemic has worsened existing inequities and shone a light on the fragility of our global food supply, which is not equally accessible and affordable to everyone. A focus on producing greater volumes of food to achieve food security has done little to deliver improved outcomes for people. As stated in the *The State of Food Security and Nutrition in the World 2022*, we are far from meeting several Sustainable Development Goals (SDGs), including the second goal: Zero Hunger. Worldwide, it has been estimated that between 702 and 828 million people in the world were affected by hunger in 2021, which is 150 million more than in 2019, with the increase largely propelled by the COVID-19 crisis (FAO et al. 2022).

Moreover, global food production volumes are not aligned with nutritional needs. We overproduce grains, fats and sugars, and underproduce fruit and vegetables (KC et al. 2018). On top of this, many people in the world cannot afford healthy diets; almost 3.1 billion people were unable to do so in 2020 (FAO et al. 2022). Yet simultaneously, nearly one third of all food produced worldwide goes to waste, including loss before consumption (FAO, 2019a; UNEP, 2021). It is estimated that the food produced globally but not consumed could feed an additional 2 billion people who suffer from hunger (WFP, 2020). Thus, it is vital to focus not only on increasing food production but also on improving food processing, storage, distribution, and food safety and nutrition so that we can minimize food loss and waste. These findings prompt the question: Can we produce less but more efficiently to meet global demand while preserving the environment and protecting the most marginalized communities?

The YSG believes that yes, we can produce less and in more efficient ways, meeting global demand while also preserving the environment and respecting marginalized and vulnerable communities. This can be possible thanks to green jobs and new and innovative production techniques, such as vertical farming, hydroponic and aquaponics, as well as through the protection of local traditional agriculture means. However, one of the aspects that is currently missing in the shift from conventional agriculture to more sustainable farming systems is concrete political and financial support from governments. Today, just a handful of corporations dominate global food production systems. Probably, the right question is: How can we create more fair, sustainable, inclusive and efficient agrifood systems given the dominance of multinational companies in the food market? How will the strengthening of regulatory mechanisms make key actors more accountable for their position and the improvement of the environment?

Even when food supply provides populations with sufficient calories, nutritional needs are often not met, leading to a global rise in chronic non-communicable diseases such as type 2 diabetes or cardiovascular diseases (Murray et al. 2020). This has been exacerbated by the rise of ultra-processed foods, which are cheap, widely accessible and heavily marketed around the globe (Baker et al. 2020; Elizabeth et al. 2020). Tragically, women and children have often borne the brunt of this crisis (O'Donnell et al. 2021). The pandemic has impacted many sectors of the economy, but agrifood systems have been hit particularly hard because many agrifood commodities, such as fresh vegetables, fruits and milk products are perishable. In addition, even before the COVID-19 pandemic, agrifood production was being affected by scarce water availability, with more than 70 percent of the world's rural population living in water-scarce river basins (FAO, 2017). A greater variability in precipitation distribution due to climate change has added further stresses on water resources. Many shocks are increasing in their severity, scope and impact (Zselezky and Yosef, 2014).

Repurposing agricultural subsidies is not common for farmers, which could mitigate economic losses and lead to gains in some scenarios.

Our agrifood systems face various shocks and stresses that affect marginal farmers, consumers and people's health and nutrition. Shocks have an immediate impact, while stressors gradually weaken systems' coping capacities. According to the FAO (2021a), shocks are defined as short-term deviations from long-term trends that have substantial negative effects on a system and its components. Shocks impacting food systems include natural disasters (e.g., storms and tsunamis), extreme climate events, biological and technological events, surges in plant and animal diseases and pests, socio-economic crises and conflicts. Stresses, instead, are defined as long-term trends or pressures that undermine the stability of a system and increase vulnerability within it. Stresses can result from natural resource degradation, urbanization, demographic pressure, climate variability, political instability, or economic decline. It is very important to understand these factors before designing any resilience-building programmes for agrifood systems.

To address the challenges of limited natural resources in crop production, we must adopt practices that enhance efficiency using agroecosystem-friendly techniques. Additionally, the commodities produced must align with nutritional goals. The transformation of our agrifood systems is urgently needed to achieve these objectives. However, there is currently no coordinated effort to evaluate all aspects of agrifood systems and their interactions from a youth perspective. The first cohort of the WFF's YSG has collaborated to investigate the causes or barriers related to agrifood systems on youth around the world. Our research has also identified opportunities to create a conducive environment that empowers more young people, particularly those from diverse backgrounds, in sustainable agrifood systems. We believe that this will help shift current agrifood system towards a more sustainable, inclusive and equitable future that promotes better health outcomes.



Chapter 2.

Challenges faced by youth who are working to advance sustainable agrifood systems

There are several factors that may affect youth engagement in agrifood systems differently. These factors include economic circumstances, culture, gender, interpersonal situations and traditions. Additionally, young people who are engaged in agrifood systems represent diverse groups with unique experiences, such as rural youth, Indigenous youth, young women, and young people from different races and ethnicities, and with different abilities, cultural or religious backgrounds and sexual orientations. As a result, challenges undermining agrifood systems are not racial or gender-neutral and may affect youth differently based on their geographical location, sex, ethnicity, culture and many other factors.

This chapter identifies and discusses the key challenges that youth face in engaging efficiently and effectively in improving agrifood systems. Specifically, it explains how the following challenges affect youth engagement in agrifood systems:

1. limited or lack of access to productive resources, services and markets;
2. negative perception and limited attractiveness of the agrifood sector;
3. limited meaningful engagement in policy processes.

2.1. Limited or lack of access to productive resources, services and markets

Evidence shows that many young people in agrifood systems have limited access to markets, productive resources and services like land, water, financial services (e.g., credit, insurance),

extension services and training. This is further exacerbated among the most marginalized social groups, as presented below.

2.1.1 Limited access to markets

Access to reliable and lucrative markets often enables producers to fulfill their goals, boost their incomes and upgrade their living conditions (Poole, 2017). However, many young producers, especially in rural areas of the Global South, do not have access to such markets (FAO, CTA, and IFAD, 2014). In these environments, young producers are often located far away from markets or lack access to adequate infrastructures. Consequently, high transportation costs and poor road infrastructure often limit their ability to access the markets (Mulema et al. 2021). Furthermore, in some cases, young producers in rural areas lack the market information, skills and organization necessary to bargain on an equal footing with other market actors.

One of the major factors driving young people away from agrifood systems is the lack of reliable and lucrative markets. Evidence presented by Mulema et al. (2021) shows that the lack of market access for young people in Zambia and Vietnam is one of the factors pushing them away from participation in agribusiness. The prevailing challenge has created excessive middlemen structures that disproportionately affect young producers from earning decent incomes from their agrifood system activities.

2.1.2 Limited access to land and land tenure insecurity

Due to the impacts of climate change, fertile land is shrinking, making it necessary to produce more in smaller areas. Desertification, flooding and soil degradation undermine land and the rights of people working there. Land is a necessity for agricultural production, yet gaining access to it continues to be one of the major challenges faced by young people in many countries (FAO, CTA, and IFAD, 2014). There is a wide range of reasons why young people often have limited access to land. Yeboah et al. (2019) explain that, in the past, many rural youths used to access land through inheritance. However, inheritance dynamics have changed over time due to longer adult life spans, continuous parceling of land and the growth of transnational agrifood corporations. Consequently, fewer rural youth are accessing land through inheritance. It is also important to note that even when land is transferred to young

people through inheritance, young women worldwide as part of a diverse group of young people are often greatly disadvantaged due to patriarchal customary practices (FAO, 2011).

Rising land prices also limits young people's access to land because they often lack the capital to purchase or rent land (HLPE, 2021). Evidence suggests that even when young people do have access to land, they often have insecure land tenure. FAO (2022a) states that "tenure systems determine who can use which resources, for how long, and under what conditions." Therefore, people with insecure land tenure face the risk that their rights to land will be threatened by competing claims and even lost because of eviction. Without the security of tenure, households are significantly impaired in their ability to secure sufficient food and enjoy sustainable rural livelihoods.

2.1.3 Lack of access to quality financial services

The availability of quality financial services, such as savings accounts, credit and insurance, is essential for young people who want to start, maintain and grow their businesses. It has been shown that targeted and tailored financial services can encourage and promote youth-led innovation in agrifood systems (Benni, Berno, and Cungu, 2022). Despite the benefits, youth can receive from formal financial services, many youth worldwide still struggle to access these services. Young agricultural entrepreneurs, compared with their older counterparts, face challenges when it comes to accessing credit, insurance and money transfer services, including lower access to traditional collateral, weaker socioeconomic networks and lower starting capital (Benni, Berno, and Cungu, 2022).

The FAO, the Technical Centre for Agricultural and Rural Cooperation (CTA) and the International Fund for Agricultural Development (IFAD) explain that young people are often perceived as a high-risk group by financial service providers because they usually lack collateral or experience (2014). Due to poor rural infrastructure and dispersed populations, providing financial services becomes too costly for providers. As a result, youth in rural areas often have a harder time accessing formal financial services (Gasparri and Munoz, 2019). Therefore, many youths have no access to financial services or often obtain financial services through informal sources, such as family and friends. This is particularly relevant for young women. In fact, the current situation shows that, despite constituting an average of 48 percent of the agricultural labor force, women receive only 5 percent of financial services, such as fertilizers and insurance. Consequently, as FAO (2021b) demonstrated, young women are more affected by shocks and crises than men due to their societal role.

2.1.4 Lack of suitable training, extension and advisory services

Extension and advisory services play an important role in the dissemination of information, research-based practices and technologies to actors in agrifood systems, particularly producers (Maulu et al. 2021). Furthermore, these services provide actors with the skills they need to run their businesses, gain access to markets and access financial services (Blum et al. 2020). In many cases, young people, especially in rural areas, and Indigenous Peoples lack access to extension and advisory services or have services that are not tailored to their needs. In some countries, men are more likely to attend knowledge and information sharing activities because of social and gender norms, while women and young people are often excluded due to family duties and household chores (Rice et al. 2019). Indeed, their social role as care givers strongly decreases the time they can allocate for informal and technical education.

This means that millions of young people and women across the world are deprived of the knowledge and skills they need to actively contribute to agrifood systems. On the other hand, young people with access to education – especially from the Global North – usually face another challenge related to agricultural studies: agriculture very rarely features in primary school curricula, whereas in higher education agricultural courses tend to be more theoretical than practical. Consequently, when young graduates set out to look for a job, they find themselves lacking the practical skills required in the job market. Besides, agricultural education – both in the Global South and North – is a highly under-represented field of study for several young people from diverse groups. For example, currently, less than one-third of agriculture PhD candidates are women (UNESCO, 2019).

2.2 Negative perception and diminishing attraction to agrifood employment

Globally, public perception of agriculture and associated agrifood systems significantly shapes youth participation. Where public perceptions are negative, they tend to drive youth away from engaging in agrifood systems. Such perceptions

emanate from the family and community levels and gain momentum at the local levels with serious implications on the ability of governments to scale up youth participation in agrifood systems.

2.2.1 Diminishing attraction to agrifood employment

The agricultural and food industry is faced with several challenges that are making it unattractive to young people, especially in rural areas. These challenges include infrastructural gaps and deficiencies, limited access to technology and information, and lack of startup ideas in agribusiness, among others. These factors are making young people turn away from agriculture, which is predominantly a rural activity. Shortcomings in the ability to receive and deliver goods and services are impacting the prospects of youth for business and career development in the sector (FAO, CTA, and IFAD, 2014; Flipo et al. 2021).

According to IIED (2012), the limitations of the agrifood sector can make urban areas more appealing to young people, reducing their opportunities for business and career development in agrifood systems. This is particularly challenging for youth, who often have limited resources to compensate for the lack of an enabling environment in the sector. Thus, they may face difficulty in getting a foothold in the industry (Yami et al. 2019).

Concurrently, the agrifood sector is also perceived as a risky investment given its vulnerability to shocks and stresses and the market volatility typical of certain commodities. As a result, careers and/or business development in the sector are less palatable, particularly for the youth, who might not have access to social networks and formal mechanisms to absorb and/or mitigate the impacts of such shocks or stresses (Geza et al. 2021).

The sector is perceived as unable to pay off for the (investment) efforts, with other market segments offering better returns (Ibid.). Participation in agriculture is often temporary or, as underlined by Geza et al. (2021), “circumstantial” rather than “aspirational” in the expectation for better opportunities to manifest. All of this has significantly contributed to an exodus en masse, facilitated by a higher level of mobility among younger generations (Girdziute, 2022), resulting in the consequent lack of a generational turnover.

2.2.2 Negative perceptions of the agrifood sector

The sector’s attractiveness is also highly influenced and shaped by social and cultural factors, from an early age (Girdziute, 2022). A dominant negative narrative can restrain youths’ potential to lead a transition toward more sustainable models. Where agriculture is portrayed as the poor man’s job, those who aspire to or are already working in the sector can face a form of “social stigmatization” (Magagula et al. 2020; Geza et al. 2021; Mulema et al. 2021). The average age of a farmer in the United Kingdom is 59, in Kenya 60, and in Japan 67 (Henriques, 2019). Research suggests that parents or relatives often discourage their children or younger relatives from pursuing careers in the agrifood sector. This is because the sector is often perceived to have low returns and to be doomed to a “subsistence” level of income, primarily for those who are uncultured and unskilled. In addition, many industries in the city area provide better wages than the agricultural sector or other businesses in the countryside. As a result, many parents or relatives encourage their children to seek their fortune in other sectors with

better prospects for upward mobility (Sumberg et al. 2017; Girdziute, 2022). Consequently, career aspirations often relate to domains other than agriculture, even in areas where this is a key economic sector (Sumberg et al. 2017).

Traditional stereotypes and the ensuing social stigma towards agriculture can also generate from outside the close circle of acquaintances and be reinforced by mass media. Lundy et al. (2007) revealed that, while the way agriculture is portrayed by some media is not necessarily negative per se, it can act as a reinforcer of negative stereotypes. At the same time, a form of ostracism might also generate from within social groups already operating in the sector, such as older farmers, decreasing its attractiveness. As a matter of fact, younger generations might be kept away, being identified as inept and unable to continue operating “viable businesses” because of perceived lack of experience (Kidido et al. 2017).

2.3 Limited meaningful engagement in policy processes

Developing evidence-based agrifood policies requires the meaningful engagement of all key actors (Waqa et al. 2017). There is a consensus that young people play a key role in agrifood systems, and their engagement is important. As outlined by the Organization for Economic Co-operation and Development (OECD 2017a),

meaningful youth engagement entails involving young people in all steps of the policy cycle, including 1) situational analysis, 2) policy development and planning, 3) policy implementation, 4) policy monitoring and evaluation, and 5) providing feedback to ongoing situational analysis.

Unfortunately, young people are often not actively engaged in most policy and decision-making steps (FAO and AUC, 2022). According to FAO, CTA, and IFAD (2014), young people usually play a passive role in policymaking as they often are not given the opportunity to influence or lead some of the processes. In addition, it may be difficult for youth, who are often volunteers, to compete with the time and resources that representatives from large transnational food corporation lobbyists have. Unpaid traineeships and internships offered by companies, international organizations and universities can exclude many young people from participating. This is a concern, as these opportunities can be valuable for gaining experience and skills in a particular field. Such exclusions may result in a lack of diversity in the workforce, as only those who can afford to work without pay are able to take advantage of these opportunities. Indigenous Peoples, women, rural youth and other underrepresented minorities are consequently the most affected. This, in turn, makes policy processes within these entities less heterogeneous and more elitist. Engagement processes that enable a platform and strong voice for these corporate entities have been criticized for this reason (Canfield et al. 2021).

Consequently, youth engagement ends up being tokenistic since young people's contributions are overlooked and/or their perspectives are not taken seriously (Spajic et al. 2019). As a result, young people are not motivated and are less likely to actively participate in policy discussions and influence them. In addition, policymakers tend to overlook the diversity of young people in terms of their gender, age, geographic location and Indigenous identity. As a result, young women, rural youth and Indigenous youth are sometimes excluded from policymaking (FAO and AUC, 2022). For example, policy engagements often occur in urban areas, which means that young people in rural areas are often left out (FAO and AUC, 2022).

One of the key global challenges today is a declining agricultural labor force. Many young people from farming families are choosing alternative careers in urban areas, which is resulting in a shrinking rural workforce. Engaging youth in farming and food production will be vital to ensure food and nutrition security now and in the future, hence suitable policies are needed to help empower and enable youth to adopt careers in agriculture.

In summary, as outlined in this chapter, youth face multifaceted challenges that are hindering or undermining their effective engagement and activism in agriculture. This is not only a consequence of limited resources and decision-making, but also a lack of the necessary support to bridge skill, knowledge and information gaps with other key value chain actors. Such limitations can doom youth to a spiral of agricultural poverty, low productivity, and/or more broadly speaking, dissuade them from entering the sector. The lack of an enabling environment is further exacerbated by social stigma towards the sector. Youth are presented with diverse professional and personal development alternatives, often portrayed as more reliable or more worth investment efforts. The sector is often represented as one offering low returns, for the uneducated/unskilled, or it is presented as having intrinsic deficiencies that are unable to meet young people's expectations. Whereas this partly reflects the limited access to resources for youth mentioned above, it also stems from a general bias, both among youth themselves and society at large, often fueled by information deficiencies. All of this restrains young people's capacity to be triggers of change for transformative agrifood systems. Whereas recent global shocks, such as the COVID-19 pandemic, have partly redrafted such a storyline, there is still a need for systemic actions to tap into the potential of youth and let them be the leaders of innovative and dynamic solutions, as described in Chapter 3.



Chapter 3.

Key enablers of youth empowerment

Four core enablers of youth empowerment have been identified by the YSG: 1) education, 2) technology, 3) science, and 4) policy. The role of each enabler in empowering young people in sustainable agrifood systems is explored in this chapter. Youth integration and engagement with agrifood systems at global, national and local

scales are determined by wider demographic factors, including gender, class, wealth, access to education and healthcare, geographic location and culture (Glover and Sumberg, 2020). Given their significance in influencing participation in agrifood systems transformation, we also explore the interaction between youth and these broader demographic factors.

3.1. Education

Education is a critical tool to engage youth and marginalized groups in agrifood systems. Awareness and knowledge are often precursors to actively driving systemic change, including poverty reduction and hunger alleviation. Indeed, it is widely proven that education is key to overcoming poverty and food insecurity. As stated by UNESCO (2017), global poverty could be halved if all adults completed secondary school education.

Education can also alleviate nutritional deficiency and improve social status, giving children and youth the opportunity to escape from the cycle of hunger by providing them with the knowledge, skills, and motivation to make informed dietary and lifestyle choices (Momo-Cabrera et al. 2019). However, the lack of access to education and related infrastructures plays – especially in the Global South – a critical role for the most marginalized youth groups and the diverse groups within. This is particularly evident for rural children that, according to UNESCO (2012), are twice as likely to be out of school as urban children.

Practical activities and training programmes, combined with theoretical education, can provide future farmers and agricultural researchers with critical knowledge about sustainability challenges in agriculture and equip them with solutions to address these cross-cutting challenges.

Indeed, by combining formal and non-formal education, young people's awareness of the links between food and its socio-environmental implications can be strengthened. As such, new training approaches for youth need to focus not only on agriculture in the strictest sense, but also include its interdisciplinary dimension, flanking this term with concepts such as sustainability, inclusivity and wellbeing.

By combining agricultural studies with practical activities, such as gardening, youth are likely to be informed about the different ways of engaging in the agricultural sector. Practical activities, such as school garden programs, have also been shown to improve consumption of fruits and vegetables (Chan et al. 2022). Sharing stories of successful young farmers and "agripreneurs" as exemplary models can definitively encourage youth to study agriculture related subjects and overcome the stigma associated with agriculture as a no-win occupation. Besides, if youth have a better understanding of scientific findings through all the education mentioned above, they will also be in a better position to carry out best practices in food production and consumption.

An accessible agrifood system also needs to consider youth who are operating a small farm and whose practical education can lead to positive aspects – in terms of practical handover from one generation to another. However, this can lead to the propagation of bad and unsustainable practices and cause the delayed adoption of modern and eco-friendly production approaches. As such, updated and science driven quality curricula on agrifood systems overcomes this challenge by interlinking universities with farming communities. This has proven beneficial for local people and academia since new types of knowledge are created, research is supported and local problem-solving is enhanced.

Moreover, continuous discoveries regarding new production tools and techniques require continuous updates of farmers and researchers. Only by fostering continuous dialogues between farmers and national academic reference standards (NARS) can the ambitious targets set by international directives be reached to assure a more equal and sustainable food supply for everyone. It is equally important to connect educational institutions with labor market opportunities and to build strong partnerships with employers to ensure that the skills of students respond to constantly changing labor market needs.

Educational programmes mostly reach young men and do not cater to the needs of young women leading to an inaccessible educational system (UNESCO, 2022). As such, alongside diversifying the types of education provided to maximize the potential of education to empower youth in agrifood systems, efforts must be made to increase access to education and diversity in science for underrepresented youth groups, including women and Indigenous Peoples. Therefore, there is a need to increase equality at all levels in order to better all social groups' present and potential knowledge and skills, as well as increase their access to the agrifood market. Besides, co-production of knowledge needs to be incentivized at all levels of education.

To increase educational opportunities in agriculture for all, and particularly for young women, systemic changes need to be promoted at multiple levels, such as:

- (i) make agriculture more attractive for youth by fostering new technologies, science and automation, and by creating specializations on service delivery for agriculture, based and fundamentally centered on technology;
- (ii) establish infrastructures (e.g., dormitories, sanitary and childcare services) for young women and Indigenous people;
- (iii) provide financial aid, quota system and scholarships for youth and all the diverse groups within;
- (iv) ensure a non-discriminatory environment through gender sensitization courses, policies to prevent discrimination and sexual/verbal harassment, and initiatives that address HIV and other sexually transmitted diseases;
- (v) promote training courses on markets and communication skills;
- (vi) stipulate flexible educational hours for families and consider the time allocated for care activities;
- (vii) increase the representation of youth and all the diverse groups within, including women and Indigenous professors in the key Chairs at Universities and academic decision-making roles;
- (viii) build a critical-thinking approach and support climate action within and outside schools;
- (ix) incentivize the co-production of knowledge among Indigenous people and scientists;
- (x) provide Indigenous Peoples, if they want, with courses in technology and farm digitalization;
- (xi) support and educate university students about Indigenous knowledge in nature conservation, sustainable practices and agrifood best practices;
- (xii) diversify the knowledge by envisioning interdisciplinary groups.

Furthermore, the contribution of young women and underrepresented groups in papers and research needs to be recognized and legitimized. Indeed, education and research allow them to become a role model for other women and marginalized groups, increasing their representation on every rung of agriculture. Moreover, the education system itself benefits from having more women and people from underrepresented groups on board since they often account for a great diversity of

Indigenous knowledge and experience in nature management and biodiversity conservation. Indigenous people safeguard over 80 percent of the world's remaining biodiversity and crop production (WWF, 2020). In turn, greater diversity of knowledge and experience contributes to a more resilient, suitable and inclusive academic system, turning a gender accessible education into an everybody-inclusive one.

3.2. Science

Science has the potential to empower young people to lead the transformation of agrifood systems by providing them with essential skills for addressing critical global issues such as climate change, biodiversity loss and food and nutrition security. By leveraging science and technology, young people can develop innovative solutions that enhance the sustainability and productivity of the agrifood sector. While the role of youth in science has been more and more recognized, several barriers prevent youth from participating in science and pursuing scientific careers. Many of the barriers that youth face are driven by social inequality, including poverty, access to education, and gender bias (Archer et al., 2013; Hitchin, Horvath, and Petie, 2017). While the extent of youth participation in science is challenging to assess, given the limited data available (Dickson-Hoyle et al. 2018), research suggests that their role is often limited to data collection (Rautio et al., 2022).

Research suggests that young people are becoming increasingly interested in pursuing careers in science, partly due to recent global events such as the COVID-19 pandemic (British Science Association, 2020). Empowering young women and underrepresented minorities to study and pursue careers in science can be achieved by removing gender and other unconscious biases in learning materials and providing support, for example, through female mentors and tailored networking opportunities.

Creating a more inclusive working environment is also important, for example ensuring equal pay, flexible working hours, paid parental leave for both parents, and childcare support. The desertification of arable lands, the scarcity of water, loss of biodiversity and other climate change impacts, can also be tackled by employing different types of already existing knowledge in the field. Local and Indigenous practices, together with digital tools, can help produce better land and transform current crises into opportunities.

Globally, young women, Indigenous youth and other minorities are in scientific fields. Often, underrepresented minorities do not have the financial ability to access quality education, schools they attend may lack key facilities to prepare them for a career in science and they may face poorly equipped laboratories and a shortage of resources (McGill et al. 2020). Involving youth in citizen science, science communication programs, education and mentoring programs can support the development of such skills (Kelly et al. 2022). To equip youth to be future-ready, entities such as the OECD suggest adding new topics to learning programs to improve science literacy. These include socio-environmental systems and sustainability, scientific knowledge development, and the misuse of science and informatics (OECD, 2017b).

3.3. Policy

Youth have powerful ideas and innovative solutions to tackle the challenges of this century, making them a fundamental resource to engage at different scales of decision-making. As noted in an article by Wharton, strategic partnerships and innovative ideas from young people are playing a crucial role in achieving the 2030 Agenda for Sustainable Development and the SDGs adopted by the United Nations in 2015 with the ambitious aim to end poverty and hunger, reduce inequality and tackle climate change (Wharton, 2018). Overall, young people are a fundamental resource to engage at different scales of decision-making and youth have a significant role in strengthening inclusive policy environments for driving sustainable agrifood systems. Given their ability to take risks and adopt innovations, youth are strategically positioned as drivers and agents of change, which is needed, particularly to enhance food security and sustainable agrifood systems.

It is crucial to include youth and ensure their meaningful engagement in all policy discussions concerning food and agriculture. By prioritizing these policies, we can help to address the challenges faced by youth in agriculture and support their active participation in the sector. In addition, rural and marginalized youth rights and roles should be promoted, so that they are not excluded from opportunities and face discrimination based on their geographic location, socioeconomic status, gender or other factors. In addition, the involvement of youth in local and national politics is crucial for the future of democracy and effective decision-making. Encouraging young people to participate in politics and providing opportunities for involvement, such as through youth-led initiatives or mentorship programmes, can help ensure that the voices of young people are heard and that policies are designed with their interests and perspectives in mind.

In terms of enhancing access to land and finance, policy priorities were identified by youth during the [World Food Forum in 2022](#). These include supporting group land acquisition (e.g., youth-led co-operatives), facilitating intergenerational land transfers, and creating statutory laws and policies that enable equal access to land. For example, in Rwanda, new land laws have been elaborated to abolish discriminatory practices which are prevailing in customary law (Abbott et al 2018). The Government of Tanzania is supporting youth participation in agriculture through a new programme that will provide farming land and a loan facility. Youth will receive a three-month training programme.

They will then be allocated funds and up to 10 acres of land each. Sixty thousand hectares of land have already been secured for the programme, enough to enable 150 000 young people to enter the agricultural sector (Wambura, 2023).

Youth engagement in policy discussions on food and agriculture has improved in recent years, with youth across the globe self-organizing to create youth manifestos that include policy solutions defined by youth related to agrifood systems transformation. The World Food Forum [Youth Action Track](#) compiled and assessed the [recommended policy solutions](#), resulting in five policy priorities for the main world regions: Europe and Central Asia, Latin America and the Caribbean, North America, Asia and Africa. However, despite the recognition of the importance of promoting healthy diets from sustainable agrifood systems, this priority, among others, remains largely absent from political and policy agendas in many regions. This suggests that the meaningful integration of youth in policy-making processes has not yet been fully achieved and that more needs to be done to support and empower youth-led initiatives seeking to influence policy to drive agrifood systems transformation.

In addition to these youth-led initiatives, young people are also being recognized as important stakeholders in intergovernmental and governmental processes. This has been embodied in the creation of a youth representative for the Climate Conference of Parties (Omrani, 2022), the “Youth Liaisons Group” and Youth Co-Chairs

for each action track in the 2021 UN Food Systems Summit (FSS Communications, 2021), and the ongoing engagement of youth advocacy groups such as Young Professionals for Agricultural Development (YPARD) in intergovernmental processes (YPARD, 2022).

3.4. Technology

Agricultural technologies involve the use of several digital solutions (such as sensors, robotics, software and connectivity, gene editing, etc.) that are fundamental to developing a resource-efficient and more competitive agrifood sector. From a production point of view, the integration of good agricultural practices – weather monitoring, sustainable mechanization or digitalization – significantly increase efficiency and resilience in the field, while decreasing environmental degradation and food loss, or the use of agricultural automation for transforming agrifood systems (FAO, 2022b). For example, meteorological tools and data research help farmers prevent agrifood losses before a natural hazard occurs, therefore limiting damage and instability. Precision agriculture is gaining more and more traction with young farmers, and is becoming a central point in international commitments, especially those concerning climate change and the adoption of sustainable techniques. For example, the EU Common Agricultural Policy (CAP) recognizes “smart farming” as crucial to forming sustainable and modern agrifood systems. However, these new digital solutions require not only scientific and financial investments to be developed, but also accessibility and education to be adopted. Indeed, farmers’ digital skills are recognized as a prerequisite for a digital agricultural transformation (FAO, 2019b; FAO et al., 2022). Moreover, digital tools are usually not integrated with local knowledge, leading to tools and models that are not applicable in every geographical context.

In the current context of a growing urban world, the rural youth population is decreasing at an alarming rate due to a massive rural exodus and migration. Moreover, the limited access to land for agricultural production, education, job opportunities, income and inclusion in policy elaboration or decision-making processes contribute to the lack of modernization in the agricultural sector. Rural youth play a crucial role in the agricultural production, processing, and distribution chains, as they provide important manpower and are often early adopters of new technologies for sustainable agrifood systems. Youth have enormous potential for innovation, adoption of new technologies, and risk-taking (FAO, CTA, and IFAD, 2014), as they are key actors in promoting and benefiting from sustainable agricultural mechanization (FAO, 2022a). Furthermore, digitalization provides new interest for youth to get involved in agriculture and move towards innovative practices.

Young entrepreneurs are leading a new wave of agricultural businesses that feature ICT-based agricultural services and are recognized for their mechanization-based approach and innovative use of technologies, such as precision agriculture, plant protection drones and unmanned tractors (Anidi, Mayienga, and Mpagalile, 2020; Houmy et al. 2021; Santos Valle and Kienzle, 2020; Sims et al. 2018). These agri-businesses create attractive employment opportunities and profitable activities for youth in rural communities, through less heavy and tedious work in the field. For example, in Ghana, a youth-led innovation and technology development hub called Sesi Technology developed the GrainMate, a simple but efficient technology aimed at helping

reduce post-harvest losses. Post-harvest loss is a major challenge facing smallholder farmers and agrifood systems in general. Hence, promoting innovations and technologies that minimize post-harvest losses contributes substantially to promoting sustainable agrifood systems. In the case of the GrainMate technology, funding from global institutions including FAO has enabled the mass production and adoption/scaling-up of the innovation among smallholder farmers in Ghana.

Technology adoption, especially in the agricultural sector, still faces several challenges such as gender equality. In many countries, women are still responsible for most of the time-consuming activities (e.g., water collection, fuelwood and food preparation), beyond the unpaid tasks (e.g., child and elderly care). Technology can be particularly relevant for young women, as their dissemination and deployment represent an opportunity to increase productivity gains and leverage gender gaps (FAO and IFAD, 2014). The employment of timesaving and new energy-efficient technologies, especially digital tools, is therefore essential for their empowerment and accessibility to the market. As a result, technology strategies built on a gender-sensitive approach can increase agricultural production and the development of other income-generating activities, especially those managed by youth women. An example is the Agricultural Innovation System (AIS), which might represent a solution to empower women at different levels. The AIS is a network of public, private and civil service actors engaged in generating, disseminating, and using knowledge and information for innovation. This system addresses inclusiveness in enabling access to technology, services and markets, as well as opportunities for participation, leadership, and representation of women, small-scale farmers and Indigenous Peoples.

In summary, as outlined in this chapter, education, science, policy and technology must co-evolve to facilitate youth-driven transformation of agrifood systems. Conclusions and recommendations on how to empower youth throughout these four key enablers emerge as follows:

Education: For youth to successfully participate in the agricultural sector, access to mixed education (formal and non-formal) is crucial. This applies to the Global South and North alike. However, the situation is particularly dire in countries where access to appropriate infrastructures, services, technologies, and training often remains quite limited in rural areas. Furthermore, agriculture should be normalized at all levels of education, starting from primary schools. This subject needs to be addressed in its social and environmental dimensions as well. This will certainly help deconstruct some forms of social stigma in our societies and make agricultural studies more attractive to young generations. To ensure that the competencies of agricultural graduates meet the needs of an evolving agricultural sector, collaboration and partnerships between the educational institutions, local farming communities and the private sector need to be established.

Science: Pursuing a career in science can empower youth to drive agrifood system transformation by equipping them with skills and knowledge to create innovative solutions to global challenges like climate change, biodiversity loss and food and nutrition (in)security. To enable meaningful youth participation in science, there is an urgent need to tackle social inequalities that prevent many young people from accessing education and finance.

“We cannot implement science without also addressing questions of access, equality and finance, and we cannot build a better future for tomorrow without including the youth of today.”

- Dr. Agnes Kalibata, Special Envoy of the UN Secretary-General for the UN Food Systems Summit

Policy: Policy must enable and empower youth to pursue careers in agriculture by making these more attractive and accessible. This can address rural to urban migration, a declining agricultural labor force, and help ensure food and nutritional security now and in the future. Policies to achieve this should focus on improving youth access to land and finance, particularly through youth-led cooperatives.

There is also a need to empower youth to participate meaningfully in policymaking processes. In recent years, youth have self-organized to develop and communicate their vision and ideas for agrifood systems transformation, with access to healthy, sustainable diets emerging as the global youth policy priority from the UN Food Systems Summit in 2021. The absence of this topic from national policy agendas demonstrates meaningful youth engagement in decision-making processes has not yet been achieved.

Technology: Enhanced development and adoption of technologies among youth can contribute significantly to boosting sustainable global agrifood systems in general, specifically in marginalized regions and communities. This can be achieved by investing in developing technologies and innovations that address challenges within agrifood systems on global, regional and local levels.

The improvement of digital knowledge is, therefore, a priority. An increase in the offer of specialized courses and training occasions should be fostered. This will result in the major involvement of young people within agrifood systems, especially where food safety and security are at risk. In a virtuous circle, this youth approach will lead to an overall increase in the technological levels of agriculture, resulting in better production rates and environmental and social performances.



Chapter 4.

Existing youth-based initiatives for improving agrifood systems

Despite the unprecedented challenges faced by the current agrifood systems, youth-based initiatives happening at the local level offer hope and opportunities for the future. Youth-based initiatives are driven by young people committed to creating positive change in the agrifood sector. The initiatives highlighted in this chapter aim to empower youth to become agents of change and contribute to the sustainability of agrifood systems through innovative and entrepreneurial solutions. Additionally, these initiatives are helping to address food insecurity, rural poverty and unemployment by creating opportunities for young people in agrifood systems.

They simultaneously promote sustainable farming practices, biodiversity conservation and climate resilience.

This chapter presents five case studies from Australia, Brazil, China and Uganda, and an interview from Hawai'i highlighting the diversity of youth-led initiatives and their contribution to engaging more youth in agriculture. These case studies examine the challenges and opportunities of existing youth-led initiatives and provide recommendations for policymakers, practitioners and stakeholders to support and scale up youth-based initiatives in the agrifood sector.

4.1. Raising the voices of young farmers

Young farmers in the Global South often face challenges that limit their productivity and access to markets. These challenges include limited access to credit, poor infrastructure, unpredictable weather patterns, and a lack of knowledge and skills to adopt modern farming techniques. To overcome these challenges, farmer organizations

have emerged as a viable approach for young farmers to directly access knowledge, technology and markets. Farmer organizations provide them with a platform for knowledge sharing, advocacy, and collaboration during the processing and marketing of their produce.

Case study: Story of Young Farmers' Federation of Uganda (UNYFA)¹

As in many countries, producer organizations in Uganda bring together farmers of all ages. Unfortunately, in such organizations, young farmers are sometimes overshadowed by the older farmers that lead the organizations, resulting in their unique challenges and concerns often being overlooked. This means that sometimes traditional farmer organizations are not the most ideal platforms for driving youth-based initiatives, raising the voices of young farmers, and encouraging their active participation in policy discourse. As a result, young farmers in Uganda founded the Young Farmers' Federation of Uganda (UNYFA) in 2016.

Young Farmers' Federation of Uganda (UNYFA) represents farmers aged 12 to 39 years. Its members include 70 young farmer associations, farmer youth groups, and school agricultural clubs totaling around 35,000 individual young farmers. The main objectives of UNYFA are to advocate for the rights and interests of young farmers; increase youth influence in policy and legislative processes; enhance the knowledge and skills of young people in agrifood systems; and provide a space for them to network and share their knowledge. All this is aimed at empowering young farmers and galvanizing their voices and interests for all to see.

¹ This case study was written by Craig Chibanda after interviewing UNYFA team members.



Figure 1. Members of the UNYFA participating in a workshop.

The UNYFA represents farmers aged 12 to 39 years. Its members include 70 young farmer associations, farmer youth groups and school agricultural clubs totaling around 35 000 individual young farmers. The main objectives of the UNYFA are to advocate for the rights and interests of young farmers, increase youth influence in policy and legislative processes, enhance the knowledge and skills of young people in agrifood systems, and provide a space for them to network and share their knowledge. All this is aimed at empowering young farmers and galvanizing their voices and interests for all to see.

The UNYFA has experienced several challenges in achieving these objectives. Among its challenges were limited financial resources, low membership and weak structures throughout the country. By establishing strategic partnerships, implementing awareness programs among young farmers and planning carefully, the UNYFA has gradually overcome these challenges. For example, the UNYFA has managed to establish sustainable partnerships with organizations such as the Andreas Hermes Akademie, the Schorlemer Foundation of the German Farmers’

Association, the Ugandan Ministry of Agriculture, Animal Industry and Fisheries, FAO, Farm Africa and Seedloan Project. These partnerships have enabled UNYFA members to actively participate in training, farmer exchange programs and policy discussions.

Some of UNYFA’s key accomplishments include establishing and supporting district young farmers associations, assisting 300 women farmers with seed loans and advisory services through the Seedloans Project, and organizing the International Young Farmers’ Exchange Program, which focuses on assisting young Ugandan and German farmers in building capacities on global agrifood systems. The exchange programme has seen over 80 young Ugandan farmers visit German farms and 30 young German farmers visit Ugandan farms. According to UNYFA’s CEO, Denis Kabiito, running a successful young farmers organization requires that its members to be fully committed to the organization, and that it is owned and run independently. In addition, he explained that working in a professional and transparent manner builds trust among members and partners. “All our efforts are to shape the future of farming,” Denis said.

4.2. Youth-driven agrifood innovation

Increasing evidence has shown that the young population is stepping up its actions to transform agrifood systems at all levels and in all forms (The Economist Group, 2021; Chimpereports, 2021). In recent years, the growing demand for sustainable food products (Fiedler, 2020; FoodTank, 2021),

has seen a surge of youth-led startups involved in diverse aspects of agrifood systems. Despite the many obstacles youth-led startups still face, many of them are paving the way toward new solutions and making remarkable contributions to the industry (FoodTank, 2018).

Case study: Story of Elixir Foods in Brazil²

Elixir Foods has been working in the cocoa chain for the last eight years, but what struck them was the huge amount of waste they were seeing coming from this sector. The beans are the main part of cocoa used and 80 percent of the fruit is usually thrown away. One of the by-products is a rich white liquid that drips from the cocoa pod. It is called cocoa honey and is filled with healthy sugars and antioxidants. But, because it ferments quickly and loses its beneficial properties, it ends up being discarded. In Brazil, more than fifty thousand tons per year are thrown away. This is a serious problem that causes the loss of potentially nutritious food, loss of a source of income for cocoa producers and contributes to environmental degradation due to improper disposal.

The Elixir Foods team took this as an opportunity to leverage science and entrepreneurship. They transformed the liquid cocoa honey waste into a powerful elixir, a nutritious food ingredient with sweet properties. The team leverages advanced computation, remote sensing and an innovative chemical formula to bring cocoa honey from farm to table through a circular economy, utilizing inputs from farmers that would otherwise be discarded. Given that many farmers and their families' livelihoods – not only in Brazil, but around the world – depend on cocoa crops, the whole cocoa industry and value chain stand to benefit from collecting and adding value to cocoa honey.



Figure 2. Elixir Foods team members conversing with local cocoa producers in Brazil.

² This case study was written by Dr. Leticia Magno after interviewing Elixir Foods team members

4.3. Empowering the research and development sector through systemic approaches

Research and development (R&D) is one of the most significant factors for agrifood systems transformation. However, the disconnection between scientific research and industrial transformation and application, as well as reductionist, single-discipline approaches to agrifood solutions limit the ability for R&D to meaningfully address systemic issues. There is an urgent need to apply more systemic measures to

address problems in the R&D sector, such as those listed above, to efficiently and effectively use precious R&D resources to develop transformative agrifood system innovations. Youth-led attempts are emerging to break down the barriers among a variety of disciplines for comprehensive solutions to specific challenges in agrifood systems, while also building stable collaborations among the R&D sector, the industry entities and governments.

Case study: Story of the Institute of Urban Agriculture (IUA) in China³

The IUA is a cutting-edge research institute located in Chengdu, China. Established in 2018, the IUA was created to address the challenges posed by rapid urbanization and the need for more sustainable and resilient agrifood systems for growing cities. The IUA brings together a talented group of young professionals from various disciplines to work on the nexus of the city, food, resources and human health.

This newly founded institute takes a multidisciplinary approach, with six main areas of focus: intelligent horticultural equipment, plant photobiology, cultivation of functional and ornamental plants, plant and human health, resource utilization of organic waste, and urban food policy and planning. The research teams are made up of young (post-80s and post-90s) experts with strong problem-solving abilities and creative ideas. The approach also aligns with the new agrifood systems discourse, which aims to tackle complex food issues from a comprehensive perspective by facilitating synergies between all sectors and actors.



Figure 3. The provincial Variety Approval Committee conducting expert field assessments on new varieties of lettuce bred by IUA, which are well-suited for urban agriculture.

³ This case study was written by Dr. Shulang Fei after interviewing IUA members.

The IUA was created through a unique partnership between the national Chinese Academy of Agricultural Sciences (CAAS) and the local Chengdu Municipal Government, allowing for effective coordination between the R&D sector, the governmental entities and industry. This makes the IUA an institute of CAAS and the main support organization for the National Agricultural Science & Technology Center in Chengdu, mandated to advance regional agrifood systems development through R&D and think-tank expertise.

The Institute's young professionals have made notable achievements, to name a few: the breakthrough technology of crop speed breeding under plant factory conditions, the development of various urban food production and waste treatment facilities, and the creation of nutritious

food products for better diets. Several startups are also emerging within the institute, with young scientists taking on top executive roles. As a local think-tank unit, the teams have also led the development of various urban agriculture plans and agrifood advisory reports for the metropolitan area, the city and multiple counties. The young scientists are also actively educating the public, particularly the younger generation, about their R&D outcomes and the science behind them through collaboration with local schools and communities. A series of educational activities have been developed, which received positive feedback from children and residents. With a focus on innovation and integration, the IUA is poised to significantly contribute to the development of sustainable and resilient urban agrifood systems.

4.4. Youth policy action in sustainable and healthy agrifood systems

As discussed above and in the literature, young people hold a stake in ensuring that the food system is able to meet the needs of our future, and that of future generations. Here we provide two case studies of how young people have been involved in policy processes to date.

The first provides an example of how young people have been successfully integrated into a multi-stakeholder governance process, and the second describes how young people have forged their own path in advocating for a healthier and more sustainable food future.

Case study: Story of youth engagement in the 2021 United Nations Food Systems Summit (UNFSS)⁴

The UNFSS aimed to "launch bold new actions to deliver progress on all 17 SDGs, each of which relies to some degree on healthier, more sustainable and equitable agrifood systems." The UNFSS was designed to be inclusive of a range of key groups, including young people. Summit organizers created three structures to achieve this goal. The first was the creation of Youth Vice-Chairs for each Action Track (five groups that addressed the key themes discussed at the UNFSS). This meant that young people had an opportunity to provide activities and discussions within each Action Track.

The second was the Youth Liaisons Group, an open youth-led space for young people to communicate, share ideas, opportunities and activities relating to the Summit. The Youth Liaisons Group was given opportunities to communicate directly to summit leaders about their concerns and agendas. Over 100 global youth leaders in food and agriculture were involved in the Youth Liaisons Group, representing over 100 youth organizations. Finally, a Youth Vice-Chair was appointed to the UNFSS Champions Network, a network of experienced advocates for food system transformation. Their role was to advise the Special Envoy and mobilize people toward discussions on agrifood systems transformation.

⁴ Both case studies under Section 4.4 were written by Kim Anastasiou.

Overall, there was a strong sense of comradery among young people trying to make change through the mechanisms that the UNFSS created. Young people engaged in over 100 independent youth dialogues and nearly 230 youth organizations and leaders joined an online consultation to directly give input to the summit outcomes.

However, improvements could be made to future processes to better facilitate meaningful engagement with young people:

First, positions could be appointed through youth-led democratic processes, rather than hand-picked by summit organizers.

Second, while the summit processes allowed plenty of opportunities for youth to be involved, the level of work expected of young people was enormous. Unlike some other UNFSS members, whose engagement was part of their paid employment, youth members were mostly volunteers. Many youth volunteers were juggling university or even secondary school studies, alongside employment and other commitments.

As a result, delivering on the large workloads that the UNFSS required was difficult for young people. Instead, summit organizers could recognize the important and unique situation that young people are facing, and appropriately compensate those in elected summit positions. In addition, multilateral instead of multi-stakeholder processes can better address some of the imbalances present in global governance events.

Third, there was no long-term plan for the liaisons group post-summit. Thus, after the UNFSS ended, the group dissolved. This represents a lost opportunity for ongoing engagement in the post-summit process, compounded by burn-out from over-worked volunteers. Overall, the UNFSS provides an important example of how meaningful engagement with young people can be designed into intergovernmental processes. The youth co-leadership model and recognition of the unique and important contributions young people can add to intergovernmental processes represents a monumental step that should not be understated.



Figure 4. Pre-Summit of the United Nations Food Systems Summit 2021.

Case study: Story of Healthy Food Systems Australia (HFSA)

In other circumstances, young people have created their own space to contribute to, and advocate for, the policy changes that they see as important. One such example of this is the formation of HFSA, an advocacy organization founded by three former doctoral students from the Sustainable and Healthy Agrifood Systems Research Group at Deakin University, Australia. While there are a plethora of Australian advocacy organizations focusing on single issues related to health or the environment, co-founders Drs Cherie Russell, Kate Sievert and Sarah Dickie describe that the rationale for starting HFSA was based on a lack of existing advocacy organizations focusing on holistic cross-disciplinary solutions.

“We couldn’t see a space that was advocating for the radical agrifood systems change that we wanted.”

– Dr Kate Sievert, Co-Founder of HFSA

They thus created an organization to advocate for holistic, multi-disciplinary solutions for the dynamic issues facing Australia’s agrifood system. Their efforts focus on solutions which account for the health, environmental, political, corporate, cultural and social determinants of agrifood systems transformation. Just over two years later, the group now has 26 members. They frequently collaborate with other advocacy groups in Australia, adding to the growing demand for policy changes needed to create a healthier and more sustainable food system for all Australians.

To date, they have contributed to over 20 policy submissions, and more than five letters to politicians. They have been involved in media communication such as podcasts and newspaper articles, as well as academic papers, demonstrating the wide relevance of holistic policy reform. They describe one of their key wins as shifting language in broader policy networks to include comprehensive health, social, and environmental considerations other than classical nutrition science. An example of such a shift is the increasing use of the term “ultra-processed foods” when referencing public health and environmental problems in Australia, a term that has relevance to the range of agrifood systems issues discussed above.

The founders highlighted multiple factors that contributed to the successful establishment of this new advocacy group, including tapping into pre-existing advocacy networks, aligning their goals with the momentum from the research world, which is pushing for holistic system-wide transformations; inviting experienced advocates into their member body; accessing free advocacy training; and legitimizing their organization through branding, position statements and incorporation as not-for-profit associations. They discuss that the establishment of more organizations pushing for similar holistic food policy reforms would help them better engage with the Government, as well as ongoing mentorship from experienced advocates, and they hope to see similar organizations established worldwide.



Figure 5. Table with fruits and vegetables.

The opportunities outlined can raise young people’s voices and build the capacity of these future leaders. To further these efforts, non-youth leaders should ensure that the positions held by youth are elected in democratic youth-led processes, and account for the volunteer-nature of youth-led advocacy. Supporting young people through mentorship, free access to advocacy training and becoming members of their organizations further legitimizes and strengthens existing efforts, enabling their voices to be raised at policymaking tables.

In summary, as outlined in this chapter, we presented the importance of engaging young people in agrifood systems and the potential of youth-led initiatives to improve agrifood systems.

By highlighting successful examples and identifying areas for improvement, these case studies will inspire and inform efforts to empower young people to become leaders in sustainable agriculture and agrifood systems. The initiatives empower youth and encourage them to engage in the agrifood sector at the local level. The youth-based initiatives in agrifood systems have demonstrated that empowering young people can create sustainable agricultural systems, improve food security and address poverty in rural communities. As such, it is crucial for policymakers, investors and stakeholders to continue supporting and investing in these initiatives to ensure that youth are at the forefront of transforming agrifood systems.

4.5 Ensuring meaningful engagement of Indigenous young people⁵

In order to discuss the issues and perspectives around ensuring meaningful engagement of Indigenous young people in agrifood systems

transformation, the YSG spoke with Indigenous youth advocate, Makalani Gomes. What follows is an edited transcript of the conversation.



Figure 6. An Indigenous youth, Makalani Gomes in her homelands while cultivating, and taking care of Kalo/ Taro cultivations.

⁵ This case study in a question and answer format was written by Makalani Gomes, Elisa Quaranta and Andrea Rosso.

Gomes: *Aloha*, my name is Makanalani Gomes. I am a Native Hawaiian as well as Filipina woman. I reside here in my ancestral homelands of Hawai'i, on the island of O'ahu in a smaller land division, called *Waipi'o*. The meaning of this is the arching water, or bending of the water, thus, showing our strong interrelation with this natural element.

My dad is a *kānaka*, Hawaiian and Portuguese. My mom is Filipina and she is originally from 'Ōla'a. This is where my roots and my ancestors are. Thus, my story is a mix of different cultures, histories, islands and waters.

YSG: What are the main challenges for your communities?

Gomes: In Hawai'i, we are facing two critical issues: water contamination which is threatening our land, food, language, and identity; and a housing crisis due to the US military complex. Consequently, many people are leaving their ancestral homeland because it is polluted and costly. Water contamination is impacting the Hawaiian agrifood system, which is mostly based on taro cultivation - a traditional staple of the native cuisine - which strongly depends on wet land.

Due to the combination of these two factors, our fisher people and farmers are becoming social and environmental activists.

YSG: What challenges do you face as a young Indigenous person being part of policy processes and interacting with western society?

Gomes: *Mahalo*, I am glad to reply to this question also because it is a way for you to change perspective.

Apart from financial resources, we lack access to educational and socio-emotional support. All these factors threaten our autonomy, stories and self-determination.

What we constantly face are language and cultural barriers when international conferences are organized, or decision-making places settled.

Besides, it is always expected that we fly to government bodies because in-person testimonies are more attractive than virtual ones. And when we manage to participate, they teach us how we are supposed to act, what we have to say or how we have to manage our funding. I have been privileged thanks to my father's job, but other young people in my community do not really know how to act or how to speak in international environments. This is maybe because we are proud of our language and of who we are, and we do not understand why we have to speak proper English to have respect and be invited to these meetings.

When invited to international events, we feel like we have to play an already planned role. To be honest, it feels awkward and horrible not spontaneous.

The paradox we face is that while diplomatic meetings happen, we have to work both to sustain our homeland and to lobby, because our rights and lands are not fairly recognized. It is easy to understand how costly it is for our community to find our place in this interconnected world.

Moreover, as a community, we are daily facing socio-environmental challenges, from women and trans people who are killed, to contaminated water. Every day we are asked to reply, support our community and raise these issues to the world. But the world does not seem to listen to our claims, and it pretends that everything is going to be fine if we trust its principles.

What we ask for is more space at all levels of policy processes and support, while strengthening our autonomy to do what our birth right is, thus, serving Earth Mother and caring for all its inhabitants.

YSG: What needs to be done to ensure meaningful engagement of Indigenous young people and spread your voice?

Gomes: I think that the real issue is getting Indigenous rights out in public to raise collective consciousness. I will explain it through an example: we asked the US Government to demilitarize an area of the island because they are ruining Indigenous lands, its water and they are threatening our identity. Because we live on an island, when you contaminate the water, you contaminate the entire environment for all the people living there since all our activities and beliefs are dependent on water. As an island, we can only rely on the natural aquifer system to deplete our water, but they are currently polluted, and this affects the entire water cycle in the islands. Besides, we do not have technology to drain our water. The US keeps postponing our request to defuel, demilitarize and decommission our Indigenous People's land. We will persist because we cannot allow someone to contaminate everything we have. It is entirely a risk for us since it affects the present, our ancestors and future generations.

Indeed, we've started developing cancer and having serious challenges due to water contamination and shortage. This is a direct threat to the cultivation of taro crops and the wet land it depends on. I must admit that this is scary because this is also a matter of human rights.

As an Indigenous community, we are aware that what we have is something that came from our ancestors, and this must be protected! Our ancestors deserve it. Our future generations too. We have a lot of food and plant varieties that need to be protected, to not lose them through the years.

To summarize, we need people to share these issues with, especially people who listen in a high governmental environment. But it is hard because no one wants to hold the US accountable for not helping us and not dealing with us. I guess this is the saddest truth.

YSG: As youth, how can we create a feeling of "us" instead of "you, me, they"?

Gomes: We have to find again a common ground in our humanity, through humility, compassion and comprehension. We, as youth activists, share different stories but we have the same responsibilities toward the present and future generations. All our children will stay on the same planet. That is why we should shift from a "me/you" perspective to a "we" narrative.

For example, I have never killed a bee – even if I am allergic – because I know its importance for nature and for us as people. I say to myself, "If they help me and my friends live, why should I kill them?"

There is a lot of pain in realizing and validating our story but there is also healing in it. Isn't it a good feeling to help and love others and create a "we" story through collaboration and empathy?

YSG: It is well known that Indigenous Peoples are the best conservationists: which actions do you carry out to protect nature and the people living there? Did you find common ground with other Indigenous young people about how you protect your land?

Gomes: I am a protector of freshwater and I often think, "Wow, Indigenous People take care of 80 percent of the remaining biodiversity." We have the technology and local knowledge from the time of our ancestors that help us preserve the quality of our nature. For example, Hawaiian Fishpond technology allows us not to catch baby fish. In this way, we are fishing but we are also maintaining the nature cycle, the number of fish and consequently the water quality is also preserved. Moreover, in-depth knowledge of the natural systems helps us be the protectors of our lands.

Understanding the entire water cycle – from the mountain to the ocean – is really needed to not violate nature and understand its boundaries and “follow its flow”. Our fisherpeople have a wide knowledge of aquaculture perfectly aligned with nature conservation and the preservation of limited natural resources.

However, we are already experiencing that our agrifood knowledge is getting lost because of climate and economic crisis, together with colonialism.

If you have to do up to three jobs to pay the rent, how can you have time to learn agricultural practices from your grandparents who are still farming the land and water in a traditional way? And if we do not farm our ancestral food, how can we transfer our ancestral knowledge about the agrifood system to the new generations? How can we make our food more appealing for the new generations that are currently contaminated by the fast-food culture?

Apart from the lack of time, some of us are facing health issues such as diabetes and heart disease because in our diet we started over-eating processed proteins, due to the fact that our fresh raw fish – our main source of food – is now very expensive. Indeed, our ancestral food is becoming inaccessible, whereas unhealthy food is cheaper, thus, more appealing for the most fragile population. And consequently, our youth know more about hamburgers and pizza than Hawaiian ancestral food, such as poi-pounded taro, poke-cubed, diced raw fish and taro leaves. We are losing it together with a big portion of our culture, language and identity.

Another issue I am struggling with, after my participation at FAO is, “Why are most of the international conferences, and decision-making spaces happening in the Global North?”

It is easier for the Global North to travel to the Global South than for us, and other people from the South, going to the North. If you want to know our story and our agrifood strategies that might help coping with climate change, you should also come to us.

Furthermore, I do not get the naming “developed” and “under-developed”. Why talk about “developed countries” when we only have different stories? Do we, as “developing countries”, have to follow the same pathway as “developed” countries that is leading to socio-climate crises?

Our story might be different, but we all came from the same ancestors, and we are supposed to take care of each other like a big family and not create two opposite terms to divide us.

YSG: How can we overcome the power of money?

Gomes: In university, we discussed the theory of circular economy. I think there should be more collaboration with folks that want to diversify and run away from capitalism and stick together.

Patriarchal capitalism is also what is supporting colonialism. I would put all the money that I have into supporting my community because I know its potential. We come from the greatest resource management community, so I know how to reciprocate my resources and how this works in a circular economy. This could be harder in a larger economy. We should stick together and collaborate with our folks, just to state it clearly. We need collaboration and intentionality when spending our resources. But we also have to face another challenge: to decolonize our brains from money. My relationship with money has been difficult but I am working on it.

Maybe, a hint could be to consider money as a reciprocal thing, and not just exchange it.

I would like to bring some words from our teachers who tell us that duality is the solution. For example, this Zoom meeting is very important as different people can meet and share experiences even if they are from the opposite part of the world.



Chapter 5.

Conclusion and recommendations

As the first WFF YSG cohort, we have come together to identify the key challenges that youth face in engaging efficiently and effectively in improving agrifood systems. These challenges were identified and discussed, including limited or lack of access to productive resources and services; negative perception and limited attractiveness of the agrifood sector; and limited meaningful engagement in policy processes. Additionally, four core enablers of youth empowerment have been identified by the YSG: education, technology, science and policy. The role of each enabler in empowering young people in sustainable agrifood systems is explored in this report, and interaction between youth and these broader demographic factors were further discussed. Furthermore, this report analyzed case studies of existing youth-based initiatives for improving agrifood systems. These case studies aim to inspire and inform efforts to empower young people to become leaders in sustainable agriculture and agrifood systems,

and have demonstrated that empowering young people can create sustainable agricultural systems, improve food security, and address poverty in rural communities. Therefore, it is crucial for policymakers, investors and stakeholders to continue supporting and investing in these initiatives to ensure that youth are at the forefront of transforming agrifood systems.

Consensus was reached by the YSG on 18 science-based and action-oriented recommendations of particular concern to youth to develop and implement for agrifood systems transformation towards 2030, to be adapted to local contexts. It is hoped that these recommendations can directly contribute to the global efforts to increase and strengthen youth engagement and action in agrifood systems, while linking to the recently endorsed Committee on World Food Security (CFS) Policy Recommendations on *Promoting Youth Engagement and Employment in Agriculture and Food Systems*.



Figure 5. Some members of the Young Scientists Group at the 2022 World Food Forum flagship event.

Eighteen Recommendations

Better Production



1. **Promote more responsible and sustainable production** by encouraging more efficient, resilient, and agroecological farming systems, adopting climate-smart, precision, mechanized, and digital tools and techniques to minimize negative impacts caused by production and foster the transition to a more inclusive and sustainable agriculture.
2. **Increase awareness about urgent production issues** contributing to the environment and related socio-economic problems, including biodiversity loss drivers, land and soil degradation, agrochemicals (e.g., chemical pesticides and fertilizers), plastic and antimicrobial abuse, nonpoint source pollution and others.
3. **Encourage continuous education and training paths** to develop the capacities of technical staff and farmers regarding the latest sustainable techniques in production to boost food security and safety.
4. **Improve young entrepreneurs' access to farm credit, improved seeds and extension services** to build their capacities in creating profitable agribusinesses that can also employ other young people, reduce massive migration, and contribute to the social transformation and development of their communities.

Better Nutrition



5. **Support nutrition across all areas of government** (e.g., agriculture, health, development, and education departments) that increase production and access to healthy foods and restrict access to ultra-processed foods.
6. **Redesign food environments for better nutrition** to increase the availability, accessibility, affordability and desirability of nutritious, sustainably produced foods.
7. **Generate positive narratives on healthy diets in sustainable agrifood systems** that highlight the co-benefits for people, climate and nature.

Better Environment



8. **Scale up climate-smart and sustainable environmental practices**, innovations and technologies among youth engaged in the agrifood systems value chain, and minimize emissions, through deliberate efforts made at the global, regional, and national levels.
9. **Leverage the holistic Indigenous knowledge systems** that enhance and protect the environment and support their systemic integration into modern and scientific knowledge systems.
10. **Better integrate agriculture and related disciplines into education** from earlier stages.

Better Life



11. **Create opportunities for youth**, particularly those living in the Global South and facing many challenges such as high unemployment rates and food insecurity, to lead on and address relevant issues undermining their local agrifood systems through entrepreneurship and action research.
12. **Create better conditions for human capital**, to improve individuals' productivity through skill development, training and education in agrifood systems.
13. **Make agricultural policies more gender inclusive** by incorporating women's and girls' perspectives and knowledge into science and policy designs. Provide them a platform to transform their local agrifood systems while improving their livelihoods.

Call for action



- Create and enhance collaboration, connection, communication, and exchange for young scientists.**
14. Enhance opportunities for funding and investment in science and technology.
 15. Connect young scientists to international organizations at all global, regional and country levels.
 16. Support mentorship and career development for young scientists to engage in agrifood systems.
 17. Establish a networking platform for young scientists for information and knowledge exchange, crafting a young scientist story from the lab to the field.
 18. Strengthen policy dialogue and create permanent seats on the policy table for young scientists at different scales of policymaking around the globe.

We believe that we can create a YSG legacy through collaboration, connection, communication and exchange. Every small step can eventually make a difference.

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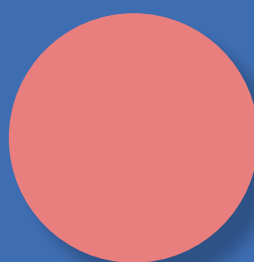
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