

# ***Supporting inclusive and innovative agri-food value chains to scale up food security and access to nutritious food within planetary boundaries: Lessons from businesses supported by Innovations Against Poverty***

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## **Introduction**

According to the [United Nations' Committee on World Food Security](#), food security is defined as meaning that all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their food preferences and dietary needs for an active and healthy life. Another term that usually goes hand in hand when talking about food security is food safety; food safety means that people have access to food that is free of contamination. Unsafe food containing harmful bacteria, viruses, parasites, or chemical substances can cause more than 200 different diseases – ranging from diarrhoea to cancers.<sup>1</sup>

United Nations estimates that world population exceeded 8 billion in November 2022. A recent study shows that the present food system could provide a balanced diet (2,355 kcal per capita per day) for 3.4 billion people only. However, if a transformation towards more sustainable production and consumption happens, 10.2 billion people could be fed without compromising the Earth system. Key prerequisites to achieve this are spatially redistributed cropland, improved water–nutrient management, food waste reduction and dietary changes.<sup>2</sup> On top of those, there are also external forces acting on food systems that need to be considered when addressing food security such as conflicts, climate variability and extremes, economic slowdowns, and poverty and inequality.

Our current food system is not providing all of us with enough affordable food to adopt a sustainable and healthy diet, and it is also stretching planetary<sup>3</sup> and social boundaries to their limits. Unfortunately, in 2014, the declining trend in hunger that had begun in 2005 came to a halt. Projections are that nearly 670 million people will still be facing hunger in 2030 – 8 percent of the world population, which is the same as in 2015 when the 2030 Agenda was launched.<sup>4</sup>

Access to enough safe and nutritious food is key to sustaining life and promoting good health and economic development for people and societies. Unfortunately, having access to safe and nutritious food is connected to where people live and how much money they can make. Latest reports from 2022 show regional disparities, with Africa being negatively affected the most. One in five people in Africa (20.2% of the population) was facing hunger in 2021, compared

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<sup>1</sup> World Health Organisation, WHO

<sup>2</sup> Gerten, D., Heck, V., Jägermeyr, J. *et al.* Feeding ten billion people is possible within four terrestrial planetary boundaries. *Nat Sustain* **3**, 200–208 (2020). <https://doi.org/10.1038/s41893-019-0465-1>

<sup>3</sup> Stockholm resilience Centre: <https://www.stockholmresilience.org/research/planetary-boundaries/the-nine-planetary-boundaries.html>

<sup>4</sup> FAO, IFAD, UNICEF, WFP and WHO. 2022. The State of Food Security and Nutrition in the World 2022. Repurposing food and agricultural policies to make healthy diets more affordable. Rome, FAO. <https://doi.org/10.4060/cc0639en>

to 9.1% in Asia, 8.6% in Latin America and the Caribbean, 5.8% in Oceania, and less than 2.5% in Northern America and Europe.<sup>5</sup>

Most of the food consumed globally is produced by farmers and supplied through agricultural value chains operated by the private sector. That makes both large and small agri-food businesses critical actors in transforming the global food system from farm to fork. This includes the seed industry, agricultural producers and food and beverage processors, among others. The *World Benchmarking Alliance* (WBA)<sup>6</sup> breaks down the food systems transformation agenda into four interlinked measurement areas: governance and strategy, environment, nutrition, and social inclusion. Critical topics where private sector action is needed are translated into indicators – 45 in total – under each measurement area. In this article, we specifically focus on topics where we have most valuable insights to share from the [Innovations Against Poverty Challenge Fund](#). That is on farmer productivity and resilience<sup>7</sup> and availability, accessibility, and affordability of healthy foods<sup>8</sup>. Several innovative inclusive business models that are reshaping supply chains from farm to fork are highlighted below.

### **At the Farm: Inclusion of smallholder farmers in the value chain of produce to increase productivity and resilience**

Many factors affecting food safety and security relate to farming: soils are the foundation and need to be healthy<sup>9</sup>; seeds need to thrive under an ever-changing climate; crops need to be protected from pests and diseases, and harvests need to be well stored before selling it.

FAO emphasises the pivotal role of seeds in agricultural development. Increasing the quality of seeds is one of the most economical and efficient ways to increase crop production and productivity.<sup>10</sup>

***Better seeds for better yields.*** In the fight against poverty and food insecurity, IAP recognises the immense potential of high-quality seeds and improved cultivation techniques to increase crop production and productivity at small-scale farms. In 2021, IAP partnered with [East-West Seed Company Ltd.](#) (EWS) in Cambodia to bring this potential to light. Cambodia's agriculture is highly concentrated in rice and cassava, with little diversity into other crops, such as fruits and vegetables.<sup>11</sup> This makes the country highly vulnerable to shocks like Covid-19, that disrupted the flow of cross-border goods. IAP supports EWS to accelerate their efforts in

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<sup>5</sup> As in note 4

<sup>6</sup> In 2021, The *World Benchmarking Alliance* launched its *Food and Agriculture Benchmark* assessing 350 of the most influential food and agriculture companies on their contribution. This benchmark serves as a road map to guide sectors through the transformation and allows both large and small companies to apply the methodology. <https://www.worldbenchmarkingalliance.org/publication/food-agriculture/>

<sup>7</sup> D23: Farmer and fisher productivity and resilience. One of the 6 indicators classified under 'transformation-specific social inclusion indicators'.

<sup>8</sup> C1: Availability of healthy foods. C2: Accessibility and affordability of healthy foods. Two of the 6 indicators under 'nutrition indicators'.

<sup>9</sup> An example of an innovative business model on creating healthy soils by producing bio-char based fertilisers from agricultural waste has been discussed in more detail [here](#).

<sup>10</sup> [https://www.fao.org/3/cb4474en/online/cb4474en.html#chapter-2\\_3](https://www.fao.org/3/cb4474en/online/cb4474en.html#chapter-2_3)

<sup>11</sup> World Bank Group. *Resilient development. A strategy to diversify Cambodia's growth model. Cambodia Country Economic Memorandum*. December 2021.

strengthening Cambodia's vegetable value chain by expanding business activities into four new provinces.<sup>12</sup> It brings an opportunity for crop diversification by smallholder farmers, thereby increasing the resilience to external shocks in the agriculture sector.

EWS's mission is to introduce smallholder farmers to improved agricultural inputs, such as high-quality seeds, and techniques to increase their yields and income<sup>13</sup>. Their approach centres around identifying key farmers to manage demonstration plots, enabling in-field trainings and field days, and digital outreach to share profitable approaches for growing vegetables. Further downstream, local consumers benefit from increased supply of locally grown, safe-to-eat vegetables. Year-round access to vegetables for local communities create opportunities to improve food security and nutrition for people living in poverty.

Through the IAP partnership, an estimated 1,835 hectares of vegetables were cultivated in four provinces during 2022 – an area the size of more than 2,500 football fields.<sup>14</sup> To illustrate EWS's impact on local vegetable market development, cucumber seed sales in Kampong Cham province are provided as an example. Yields from EWS's cucumber seed varieties have proven to be more than 80% higher than the national average cucumber yield in 2020.<sup>15</sup> Cucumber cultivation had an estimated 50% share among all crops.<sup>16</sup> This resulted in more than 15 thousand tons of cucumbers produced in Kampong Cham alone. That is nearly three times as much as Cambodia's annual production in 2019, when EWS was not yet active in the province.<sup>17</sup> This example shows that business activities of selling improved seeds in combination with training smallholder farmers on cultivation techniques has tremendous impact on the supply-side of local vegetable markets. On the consumer side, once the partnership finishes, it will be possible to estimate the number of people that benefited from increased accessibility and affordability of locally grown, safe-to-eat vegetables.

A key challenge in the seed business is the rising input costs that reduce farmers' profitability of growing vegetables. To follow such trends closely, EWS is monitoring the return on investment for its key farmers by tracking all costs and returns in a logbook. Again, taking cucumber cultivation as an example, the net benefit was 695 USD per 1,000 m<sup>2</sup> in 2021 for a crop cycle of two months.<sup>18</sup> This is more than four times the average monthly agricultural income for rural farmers.<sup>19</sup> In 2022, the net benefit reduced 14% to 599 USD per 1,000 m<sup>2</sup> for the same crop.<sup>20</sup> Although still a profitable proposition for smallholder farmers, it shows the

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<sup>12</sup> Kampong Cham, Kampong Speu, Takeo and Prey Veng.

<sup>13</sup> East-West Seed implement its mission through its foundation [East-West Seed Knowledge Transfer](#).

<sup>14</sup> Figure based on amount and type of vegetable seeds sold and their recommended seeding rates.

<sup>15</sup> Yields from 127 demonstration plots in 2022 amounted to 26.9 tons cucumber per hectare on average. National Institute of Statistics, Ministry of Planning in Cambodia. *Cambodia Agriculture Survey 2020 (CAS2020)*, p.107.

<sup>16</sup> Estimates on area of land planted are based on seed sales by EWS in Kampong Cham during 2022 and the recommended seeding rates for each seed variety sold.

<sup>17</sup> National Institute of Statistics, Ministry of Planning in Cambodia. *Cambodia Inter-Censal Agriculture Survey 2019 (CIAS19)*, p. 108. Table 3.14a.

<sup>18</sup> Figure based on 80 demonstration plots in 2021 and 104 demonstration plots in 2022.

<sup>19</sup> National Institute of Statistics, Ministry of Planning in Cambodia. December 2020. *Report of Cambodia Socio-Economic Survey (CSES) 2019/20*, p.111, Table 1.

<sup>20</sup> As in note 15

effect of rapidly rising inputs costs. Moreover, it makes tracking farmers' net returns essential for EWS to share evidence-based profitable approaches for growing vegetables.

### **Reaching consumer's table: inclusive distribution channels to enhance accessibility of nutritious foods**

Among the major inequities that can be found along the food system is the variable accessibility of nutritious foods across the world. In this context, accessibility refers to the stable availability of nutritious, affordable, and healthy foods. Businesses play an important role in providing physical access (availability) and economic access (affordability), benefitting consumers directly.

Food security can only be reached if food is available and affordable for consumers. FAO defines food availability as the availability of sufficient quantities of food of appropriate quality, supplied through domestic production or imports (including food aid).<sup>21</sup> Affordability measures the cost of a diet in relation to income and might result in many people - especially people living in poverty, in every region of the world, being unable to afford healthy diets. For example, vegetables, fruits, and nuts that are high in essential nutrients are often less affordable, especially in low-income countries. Almost 3.1 billion people could not afford a healthy diet in 2020. This is 112 million more than in 2019, reflecting the inflation in consumer food prices stemming from the economic impacts of the COVID-19 pandemic and the measures put in place to contain it.<sup>22</sup>

In this section, two examples of inclusive businesses that make healthy food available and affordable for low-income families are provided. The first example showcases Nutridense, an Ethiopian company making oat-based products available in the market. The second case describes the work Yellow Star is doing in Uganda to sell nutritive food at an affordable price where no one reached before with this type of products.

***Oats for all.*** Oats-based food products are widely consumed globally. However, Ethiopia has been an exception to this trend. Even though oats have been grown for thousands of years in the country, it has been mainly used as an animal feed crop.<sup>23</sup> There has been a taboo around the use of oats for human consumption, as people believe it to cause infertility. The production and human consumption of oats was therefore limited and occurred largely unofficially, as it was discouraged by government extension services

Led by Alem Greiling, Nutridense Agroprocessing PLC started pioneering the popularisation of oats-based products across Ethiopia in 2016. Since then, the company has been working in collaboration with the Ethiopian Institute for Agricultural Research (EIAR) on introducing an improved variety that provides better yields and nutrition. As a fruit of this effort, an agriculture extension service for the production and consumption of oats was recently launched by the Ministry of Agriculture. This is a big leap considering it was a grain whose production used to be discouraged. Oats are a gluten-free whole grain and an excellent source

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<sup>21</sup> FAO Policy Brief Issue 2, 2006.

[https://www.fao.org/fileadmin/templates/faotaly/documents/pdf/pdf\\_Food\\_Security\\_Cocept\\_Note.pdf](https://www.fao.org/fileadmin/templates/faotaly/documents/pdf/pdf_Food_Security_Cocept_Note.pdf)

<sup>22</sup> As in note 4

<sup>23</sup> G.A. Hareland, F.A. Manthey, Oats Encyclopedia of Food Sciences and Nutrition (second ed.), Academic Press, Oxford (2003), pp. 4213-4220#

of important vitamins, minerals, fibre, and antioxidants. They can play an important role in addressing the issues of food security and nutrition. For this reason, IAP and Nutridense partnered in 2021 to implement the first oats value chain development initiative for human consumption in Ethiopia. It includes smallholder farmers as oats suppliers and people living in poverty as consumers of oatmeal, granola and oats-based cookies.

Before the IAP partnership, Nutridense was processing oats on a limited scale: 10 kg of oats per batch, due to manual cleaning and drying. With support from IAP, the company is currently scaling up production through the mechanisation of their facilities with cleaning, steaming, drying and rolling machines. The steamer, for instance, has increased the production capacity of the company by fivefold. Once the remaining machines are put in place, production will be boosted further.

The collaboration between IAP and Nutridense goes beyond production, and it covers the full spectrum of the oats value chain. For example, being an unknown business opportunity for farmers and agri-dealers, there was a shortage of nutrient-rich oats seeds in the country. This inspired the company to work directly with small-scale farmers in an oats seed multiplication initiative. To do so, Nutridense purchased 1,000 kg of improved oat seeds from EIAR and implemented a contract farming scheme to train and closely work with 10 farmers for seed multiplication. Despite some challenges like the armed conflict in the Tigray Region that affected the first harvesting season and led to weak adherence by farmers to contract agreements, the company continued testing and improving the model. For the second round of seed production, the company managed to purchase from farmers cooperatives 1,500 kg of improved seeds that were then distributed mainly among the farmers from Chacha Farmers' Cooperative Union. Since the beginning of the partnership with IAP, Nutridense has sourced 70,062 kg of oats from 262 smallholders to produce their nutritive products.

Nutridense is making nutritious oatmeal products available where no one did before, and it is doing so by distributing their products in supermarkets, baltinas (small shops) and women-owned coffee vendors in Addis Ababa. But also, their products are available through the online trading platform HelloMarket where, surprisingly enough, is gaining attraction and demand also among the low-income segments. Besides being a first-to-market player, Nutridense seems to have introduced a product that is highly accepted by middle- and high-income consumers. The company has sold over 10,000 oats-based products in the last couple of months through urban supermarkets. On the other hand, penetrating low-income segments has been proved to be slower. With that said, already 15 women-owned baltinas have started to include Nutridense's products in their shops. To trigger the demand, the company has also started a collaboration with women owning small coffee shops. What we have seen confirmed is that to introduce a new product in low-income markets, companies need to roll-out marketing and awareness campaigns for low-income customers to understand the benefits of consuming oats-based products. By doing so, demand will increase, and shop owners will be more likely willing to accept (and in some cases even pre-pay) for newly available nutritive food products without fearing that they will stay on their shelves for a long time. This proves that making a nutritious new product available on the market needs to be paired with rolling out marketing and consumers awareness campaigns.

A company that has successfully deployed an innovative last mile distribution strategy to efficiently reach low-income rural markets is Yellow Star based in Uganda. This is especially important in the fight against food insecurity since it brings nutritious food products to areas that have been previously neglected by businesses. Traditional distribution models to last-mile markets come with high distribution costs that translate into expensive products that are not affordable for low-income consumers.

***Partnerships for last-mile distribution.*** Malnutrition affects millions of Ugandans and is particularly devastating for women, babies, and children. Just to name an example, 45% of child deaths in Uganda is attributed to nutritional deficiencies. Even though there are nutritious food products in the markets, they are mostly within the urban centers and with very little outreach to rural areas where 75% of Uganda's population live and most of these nutritional deficiency cases emerge. Thus, the last-mile distribution challenge is a typical underlying contributor to malnutrition in rural areas.

Florence Okot founded Yellow Star Food processors in 2014 as an agro-trading company. Soon recognizing the great need for nutrient-rich foods, the company started processing grains and cereals into fortified porridges and flours. Given Yellow Star's understanding of the business opportunities available in low-income markets, IAP started to support the company to develop affordable packaging and an efficient distribution model that could allow for profitably selling its nutrient-rich instant flour in low-income rural areas at half the price.

The company works closely with farmers imparting knowledge through training on good agronomic farming practices for sustainable agriculture and better market access for their produce. Currently, Yellow Star is working with 13 farmer groups in Northern and Eastern Uganda (with a combined membership of more than 3,000 small-scale farmers), thereby establishing a secure supply of raw ingredients (maize, cassava, rice, millet, groundnuts, and soya beans) for food production purposes. Yellow Star currently sells 300 tons of nutrient rich products annually, and this is expected to grow to 1,000 tons annually in the next five years. Part of the IAP grant was used to construct an ultramodern factory facility to boost production to meet the ever-increasing demand.

The grant was also used to grow the company's last-mile distribution channels, especially as low-income markets represent a largely untapped business opportunity. The rural markets embody a significant consumer market that is often overlooked and underserved. Yellow Star, through its partnership with an NGO called Healthy Entrepreneurs, can access a network of over 1,200 community members who act as last-mile distributors and sales agents of the company's range of nutritious food products. The company has grown its order size from 1-2 tons to 5 tons monthly under the Healthy Entrepreneur distribution model over a 2-year period. Aside from having a vast distribution network, Yellow Star also customized their packaging to smaller units of 250 g and 500 g to meet the daily purchasing power of low-income customers. The company is more intentional in its way to reach these markets while remaining profitable and serving a social purpose. During the three years that IAP and Yellow Star collaborated (2017-2020), the company increased its production capacity and sold 297 tons of different products (millet flour, soya rice flour, pure rice flour, soya rice flour mixed with oats and milk, soya rice mixed with silverfish). Of these, 123 tons were sold to low-income markets, making nutritive food products affordable and impacting the lives of 13,300

people living in poverty. Or, as said by a consumer: “Yellow Star products are accessible. You do not have to move long distances to look for them since they are always within the village.”<sup>24</sup>

## **Conclusions**

We are now only seven years away from reaching the goals set by the 2030 Agenda for Sustainable Development and while many targets are on their way to be met, the possibility to reach SDG 2 Zero Hunger<sup>25</sup> is diminishing each year. The intensification of the major drivers behind food insecurity and malnutrition trends (i.e. conflict, climate extremes and economic shocks) combined with the high cost of nutritious foods and growing social, economic and political inequalities will continue to challenge food security and nutrition. Unfortunately, this will be the case until food systems are transformed, become more resilient and are delivering lower cost nutritious foods and affordable healthy diets for all, sustainably and inclusively.<sup>26</sup>

By working with food processing companies, agricultural input suppliers and distributors, IAP is showing how innovative and inclusive value chains can play an important role in addressing poverty and combating food insecurity -while being profitable. Our top-three take-aways for actors from the private and public sectors are:

- The potential for high-quality agricultural inputs and improved cultivation techniques to increase productivity within planetary boundaries is immense.
- Strengthening collaborative linkages among value chain actors results in more resilient farmers and food systems that can provide affordable healthy diets.<sup>27</sup> For example, strong partnerships for last-mile distribution or for raising awareness (such as the one between Yellow Star and Healthy Entrepreneurs) can result in a more cost-effective distribution model. One that lowers transport costs and therefore makes nutritious food more affordable and available in rural communities. This contributes to improved and diversified diets in low-income communities.
- Investments and resources need to be directed to such innovative inclusive businesses to scale the effort. Public-private partnerships will be extremely important for investments in agrifood systems.

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<sup>24</sup> More information about Yellow Star’s work can be read [here](#). And interesting findings about company’s impact can be read in this report by 60Decibels [here](#).

<sup>25</sup> Here we refer especially to two targets, Target 2.1 By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round. And Target 2.2 By 2030, end all forms of malnutrition, including achieving, by 2025, the internationally agreed targets on stunting and wasting in children under 5 years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women and older persons. <https://www.un.org/sustainabledevelopment/hunger/>

<sup>26</sup> As in note 4

<sup>27</sup> The cost of healthy diets can be close to five times more than energy sufficient diets. And even nutrient adequate diets cost more than the international poverty line, without ensuring that recommended food group proportions are met. Herforth, A., Bai, Y., Venkat, A., Mahrt, K., Ebel, A. & Masters, W.A. 2020. Cost and affordability of healthy diets across and within countries. Background paper for The State of Food Security and Nutrition in the World 2020. FAO Agricultural Development Economics Technical Study No. 9. Rome, FAO. <https://doi.org/10.4060/cb2431en>