Investment opportunities at the intersection of environment and nutrition

Report highlights

October 2025

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With a deficit in both supply and consumption of healthy and diverse foods, we are not on track to meet SDG objectives

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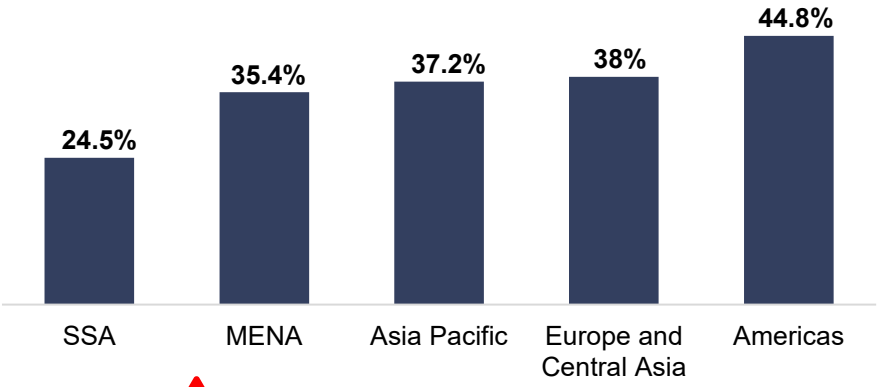
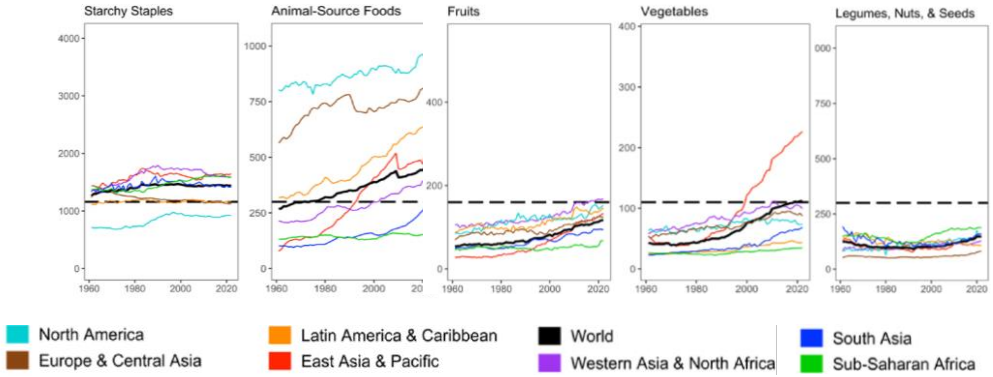
In most countries, <50% of population[1] is consuming the five recommended food groups for a healthy diet

Proportion of population consuming diets with all five recommended food groups (in %)



Insufficient supply of nutritious foods across Africa, Asia and Latam contributes to the inability to meet healthy diet recommendations

Regional food supplies relative to 'Healthy Diet Basket' targets[2], 1961-2022 (in kcal/ capita/ day)



With only five years remaining until the 2030 SDG deadline for achieving zero hunger, projections indicate that **582 million people will still be chronically undernourished by the end of the decade — more than half of them living in Africa.**

Notes: (1) 41 countries surveyed in 2021 represent two-thirds of the world's population., (2) Black dashed lines indicate Healthy Diet Basket targets used to measure access to a healthy diet as recommended in FAOSTAT national dietary guidelines.; Sources: Global diet quality project, Global Nutrition Report 2022, GAIN article, UN FAO, Costlow et al., 2025.

Climate change is increasing risks related to food security and healthy diets...

Climate change impacts food production... → **...Increasing nutritional challenges**

Reduced productivity

- **Lower agricultural production**
  1-5% reduction in agricultural production per decade with climate change compared to scenario with no climate change.
- **Lower fish stocks**
  5-10% decline in fish catch in tropical marine ecosystems by 2050.
- **Non-viability of rainfed crops**
  For instance, on a +4°C emissions path, rainfed crops like common beans in much of southern Africa will become unviable.
- **Nutrient dilution** decreases in the concentration of essential micronutrients like iron, zinc, and protein in crops.

+

Variability due to extreme events

18-43% of variance of yield anomalies attributable to climate extremes during growing season (droughts, floods and heatwaves), depending on crop type.

+

Increased stress from displaced population

Up to **200 million** people could be displaced by climate change by 2050, placing additional pressure on regions that remain agriculturally productive or have untapped farming potential.

=

Increased nutritional deficiencies

- **175m** more people will be zinc deficient by 2050.
- **122m** more people will be protein deficient by 2050, mostly in Asia and Africa.
- There is also a strong link between **drought and stunting** in children.

Source: Our World in Data, CGIAR, GAIN.

...And food systems are partly responsible for this climate change

Food production contributes to environmental degradation...

1. Greenhouse gas emissions

26% of global greenhouse gas emissions come from food production.

2. Land use

50% of the world's habitable land is used for agriculture[1].

3. Freshwater withdrawals

70% of global freshwater withdrawals are used for agriculture.

4. Eutrophication

78% of global ocean and freshwater eutrophication[2] is caused by agriculture.

...Exacerbating climate change and other environmental challenges

- Climate change
- Water stress and scarcity
- Biodiversity loss

Notes: (1) Habitable land is land that is ice-and-desert-free., (2) Eutrophication is the pollution of waterways with nutrient-rich water.; Source: Our World in Data, CGIAR.

Strategic investments in nutrition and environmental sustainability can transform a vicious cycle into a virtuous one of growth and resilience

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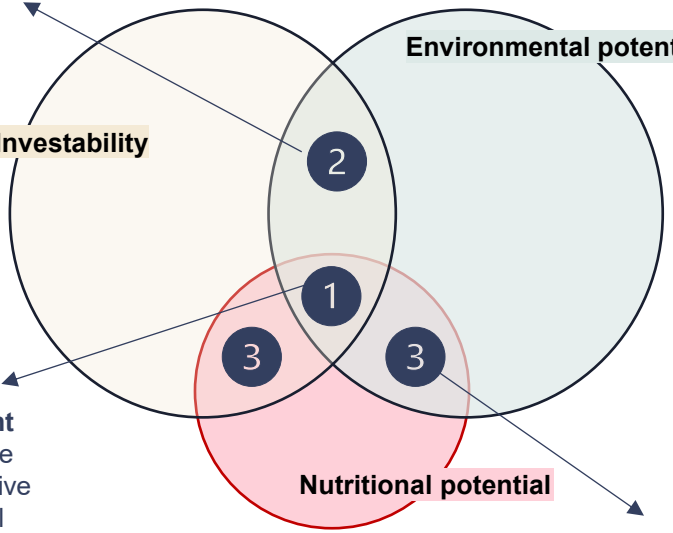
Scope of this report: Finding investment opportunities at the nexus of nutrition, environment and investability

2nd priority: Can we improve the nutritional impact of other value chains where DFIs are already active:
- At a negligible additional cost, and/ or
- Delivering significant nutritional benefits?



1st priority: Can we increase investment in value chains where DFIs are already active and where nutritional potential is high?

3rd priority: Are there value chains with high nutritional potential where **we can improve environmental impact or uncover more viable investment opportunities?**

Why are DFIs ideally placed to invest in nutritious food companies?

- **Capital investment:** The seven DFIs studied for this report have already invested $4bn+ in nutritious value chains.
- **Mandate to invest in line with SDGs:** To enhance climate action, promote good health and achieve zero hunger.
- **Higher risk tolerance**: In frontier markets and invest patient capital for longer durations.
- **Catalyst**: By de-risking and mobilizing additional private capital.
- Beyond capital, they can provide **advocacy and technical support.**

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Methodology

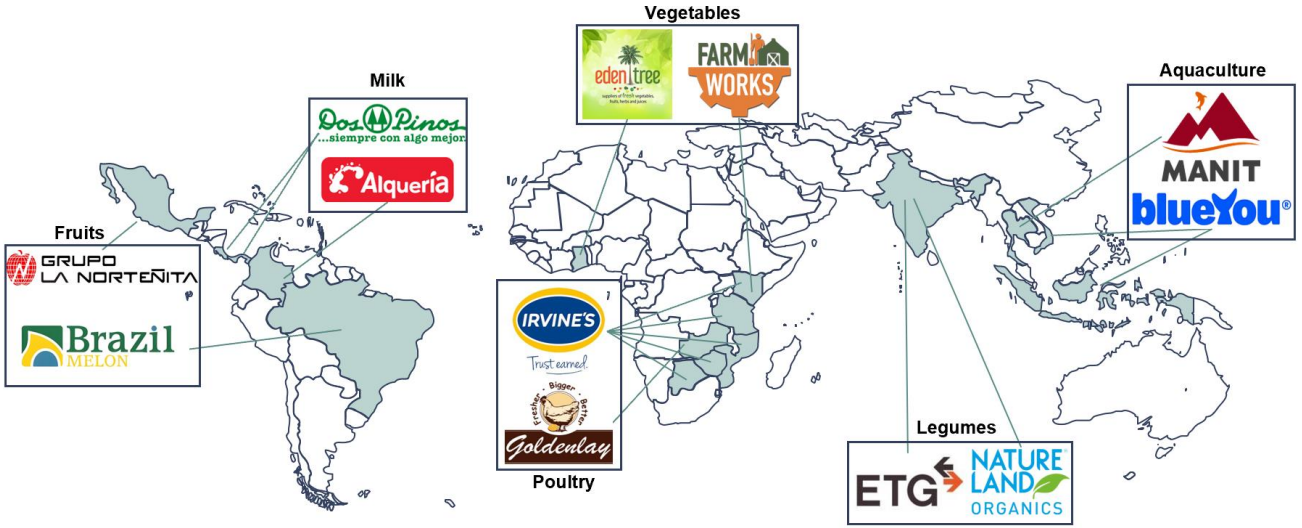
Analysis along 3 selection criteria to prioritise 6 food value chains…

1. Nutritional impact, with a focus on food with inherent nutritional value.

2. Environmental impact across four indicators: GHG emissions, terrestrial acidification, water use and land use.

3. Investability, with global market size and number/ amount of DFI investments used as proxies.

... across SSA, S&SE Asia, and Latam with two case studies per value chain



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The seven DFIs analysed have a formal commitment to reducing environmental impact…

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All DFIs included in this study have publicly set a net zero goal for GHG emissions[1]…

…as well as additional environmental targets

"We aim to support our customers (…) to improve their sustainable use of natural resources, such as water."

"Avoid or minimize pollution to air, water and land, and promote the sustainable use of resources, including raw materials, energy and water."

"Investing in biodiversity."

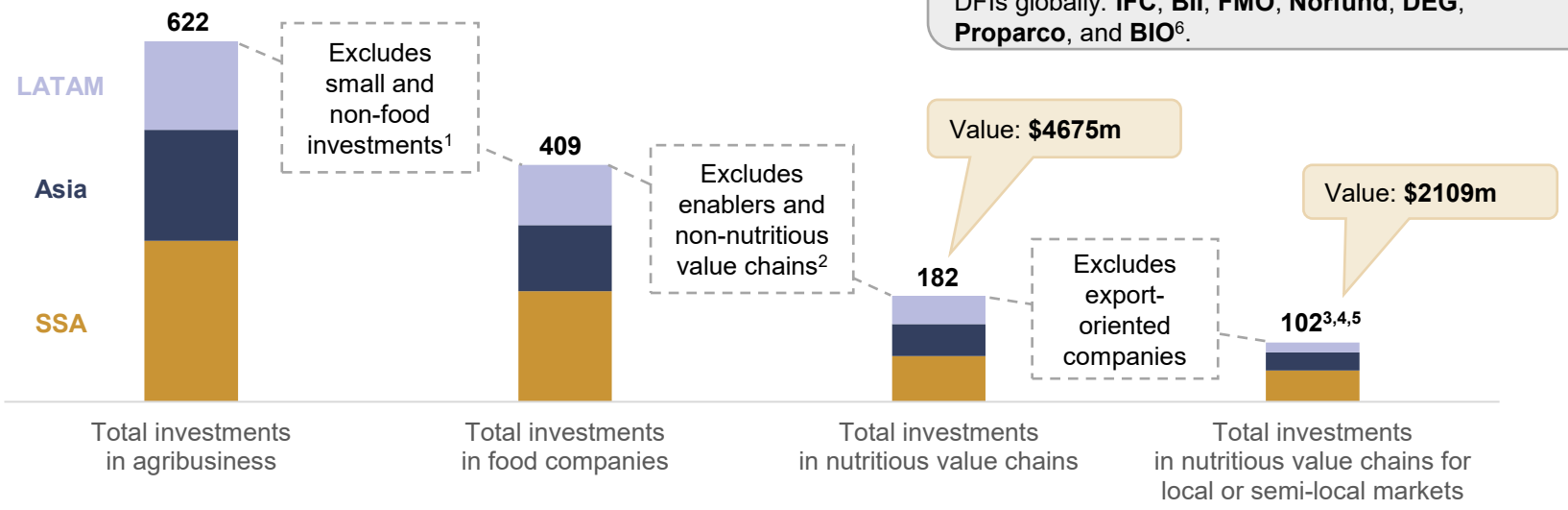
"No net loss of natural habitat."

Notes: (1) Greenhouse Gas, Proparco's contributes to AFD's commitment of becoming "100% compatible with the Paris Agreement." BIO does not explicitly mention net zero emission but claims to "Support its clients to steer capital towards the low-carbon, resilient and ecological transition as defined in the Paris and Kunming-Montreal Agreements on climate and biodiversity;
Source: FMO's climate action plan, Norfund's Policy for Environmental and Social Sustainability, Proparco's 2023-2027 strategy, BII Climate change strategy, IFC's alignment with SDGs, sustainable crop production and practices for sustainable investment in the livestock operations, DEG Impact Climate Commitment 2024, BIO Development & Sustainability Report 2024.

…And while not always formally stated, DFIs also invest in nutrition: Nearly half of their food investments are in nutritious food value chains, of which the majority serve local markets

Repartition of DFI investments by region (number of investments)

The database includes information on investment portfolios of a subset of seven DFIs, which should not be considered as an accurate representation of all DFIs globally: **IFC**, **BII**, **FMO**, **Norfund**, **DEG**, **Proparco**, and **BIO**[6].



Notes: (1) Excluding small investments (<$0.5m) that are technical advisory investments, (2) Excluding non-nutritious value chains such as cacao, heavily-transformed products, and foods that do not achieve at least a neutral score in the N3F nutritional value rating; (3) There has been 102 investments in 97 companies (DFIs co-invested in four companies); (4) 10 companies did exclusively rice and/ or wheat and/ or soy and have been excluded following discussions with GAIN; (5) Local and semi-local markets excludes exports that are not regional; (6) These 7 DFIs were selected in partnership with GAIN based on the availability of data on agro investments; Source: Hystra analysis based on DFI's investment database, 2025.

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Fruits in Latam: A large, growing market with opportunities to increase local consumption and reduce post-harvest losses

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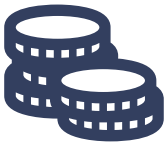

$140Bn production market

4.2% projected annual revenue growth through 2030

High inherent nutritional value, with essential nutrients including vitamins A and C, fibre, and antioxidants

Consumption at **55%** of WHO-recommended intake (above the 40% global average)

Low average negative impact across all environmental indicators

Main impact drivers include land use change, fertiliser use and irrigation

Opportunity 1: Localising consumption

While Latam is the second-largest fruit producer, a sizeable share of production is exported. Exports will continue to rise thanks to a dynamic market, but there are also economic opportunities to increase local consumption.

- La Norteñita, a Mexican fruit company, has managed to earn 40% share of fresh apples' market in Mexico, with ~$100m in revenues in 2024. Strategies include promoting local retail, public procurement (e.g., school meal programs), and product formats tailored to affordability and increased shelf life.

Opportunity 2: Reducing post-harvest losses

In Latam, around 30%* of fruits are lost post-harvest, representing a missed opportunity to increase availability at a lower price while also reducing fruits' environmental impact.

- Expanding low-energy preservation methods (e.g., drying) and modern technologies (e.g., cold storage or controlled atmosphere chambers like those used by La Norteñita) can reduce losses and enable year-round supply of nutritious products.
- Additionally, regenerative practices such as mulching and moisture monitoring implemented by Brazil Melon, a Brazilian fruit grower, can help maintain product quality and reduce losses at the farm level, while also reducing water consumption/costs.

Source: (*) Global food losses and food waste (FAO,2011) – Figure 6 excluding agriculture and consumption stages.

Vegetables in SSA: A small market with strong growth potential and opportunity to strengthen market access, reduce post-harvest losses and expand reach locally

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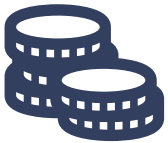

$18.5Bn production market, the region with the lowest production of vegetables (5% of global production)

10% projected annual revenue growth through 2030

High inherent nutritional value and provides essential vitamins, dietary fibre, water, and antioxidants

Consumption represents **46%** of WHO recommendations – lower than the 60% global average

Low average negative impact across all environmental indicators

Main impact drivers include land use change, fertiliser use and irrigation

Opportunity 1: Supporting aggregators and distributors to improve market access

In a fragmented market made of smallholder farmers, the key lever for increasing productivity and local consumption lies with distributors:

- FarmWorks, a Kenyan agro distribution company, is on average, increasing the productivity of its 3,000 partner farmers by over 30% - mainly due to guaranteed offtake. It uses software to track the entire supply chain – from farm gate collection to delivery to final sale – minimizing theft, delays and post-harvest losses (see below).

Opportunity 2: Segmented offer to reduce post-harvest loss and increase affordability

In SSA, up to 40% of vegetables are lost post-harvest:

- FarmWorks has cut post-harvest losses to just 3% through (i) efficient logistics and (ii) graded sorting of products.
- Eden Tree, a Ghanian processor and distributor of vegetables, plans to install dryers to valorise lower-grade/ damaged produce.

Opportunity 3: Expanding reach to increase customers' access to nutritious food

- Eden Tree's retail expansion from high-end supermarkets and hotel, restaurant and catering clients to local shops, street vendors and e-commerce, helped the company increase output and revenue by 15%.

Legumes in S&SE Asia: A small market with opportunities to further localize production and increase value addition

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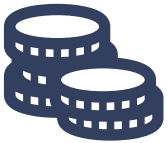

$49Bn production market, accounting for 50% of global production

2.3% projected annual revenue growth through 2035

High inherent nutritional value, among the most affordable sources of protein

Consumption represents **36%** of WHO recommendations – higher than the 26% global average

MEDIUM average negative environmental impact, with low GHG emissions but high water use

Regenerative agriculture practices and deforestation-free cultivation can help reduce impact

Opportunity 1: Increased productivity coupled with market access

While S&SE Asia is the largest producer of legumes, it still imports several millions of tons per year, with high volatility across the years. Additional challenges include varying quality and low productivity; training, input provision and guaranteed offtake could help address these.

- Natureland Organics, an Indian company offering >175 organic food products, establishes long-term partnerships with 10,000 farmers, offering them seeds, agronomic advice and product off-take, enabling them to boost incomes while ensuring a diverse, reliable supply.
- ETG, India's largest legume processor, currently imports a large share of its legumes to ensure a constant supply of high-quality legumes to the market but aims to grow local sourcing beyond 30%.

Opportunity 2: Addressing the organic segment

While the legume market is still niche and low-margin, some segments have strong growth potential (e.g., 20% CAGR in India's organic market) and the ability to generate carbon credits.

- Natureland Organics has been growing at a fast pace over the recent years, with current revenues of $20m – 90% of which comes from India. It pays for supplying farmers' organic certificates – remaining proprietor of those, limiting side sales to competitors – and facilitates generation of carbon credits for their organic cultivation.

Milk in Latam: A mature market with opportunities to improve nutritional and environmental impact

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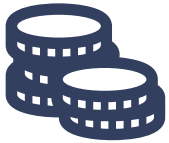


$85.5Bn production market, mainly for local production

0.7% projected annual revenue growth through 2035 (1.7% for yoghurt in 2026)

High inherent nutritional value, key source of calcium, vitamin D, and other essential nutrients

132kg consumed per person per year, below levels in Europe and North America. 80% of adults in Latin America still consume too little calcium

MEDIUM average negative environmental impact, with low GHG emissions compared to other animal-based foods but high relative to most plant-based foods

Enteric emissions, feed and manure are the main drivers of impact – with proven solutions to reduce these impacts

Opportunity 1: Improving access to low-sugar dairy products

Shifting consumer habits towards healthier dairy options is a commitment that some leading companies in the region have started to make:

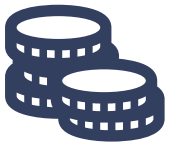
- Alquería, a leading Colombian dairy company, improved the nutritional profile of 79 of its products, adding micronutrients or probiotics to 21 of them.
- Dos Pinos, a Costa Rican cooperative, gradually reduced sugar quantities in its products to allow consumers to adjust. Between 2021 and 2023, it cut yogurt sugar by up to 83%.
- Alquería's network of 140,000 small shops and affordable packaging (e.g. UHT milk bags) ensures access for low-income households, especially in remote areas without cold chains.

Opportunity 2: Scaling proven environmental best practices

Milk environmental footprint can be significantly improved by adapting farming practices – large processors have a role to play in helping small-scale farmers in their supply chains adopt these practices:

- Alquería supports 5,500 farmers with training, solar-powered cooling, and manure-to-biogas systems. It also monitors deforestation using geo-referencing and has developed partnerships for regenerative grazing over 130,000 acres.
- Dos Pinos supports its farmers using a point-based system covering environmental, social, and animal welfare performance to assess farmers' current impact and their most pressing needs. Dos Pinos also implements circular practices in its processing operations, for instance reusing 200,000 m^3 of water (10% of total consumption) and converting 100% organic sludge into biofertilizer.

Poultry in SSA: A small market with rising demand and opportunity to improve productivity, scale egg production and valorise eco-friendly by-products



$27Bn production market for poultry meat (3% of global production)

$6.8Bn production market for eggs

1.9% projected annual volume growth through 2035

Eggs, organ meats and minimally processed poultry are densely packed with essential macro- and micronutrients

3.8kg consumed per person per year, below the 14kg global average despite per capita consumption doubling over the past 20 years (2.2kg of eggs per year vs. 10.2kg globally)

Medium average negative environmental impact, with eggs scoring better than meat

Deforestation-free feed cultivated through regenerative agriculture practices and manure reuse are the main drivers to reduce environmental impact

Opportunity 1: Increased productivity (weight per head/ kg of feed)

Improved breeds offer cost-effective, lower environmental impact opportunities to address low poultry productivity in SSA and meet rising demand.

- Irvine's Group, a vertically integrated poultry company, commercialises cobb Day Old Chicks that offer lower feed conversion ratio, higher egg output and better disease resilience. Dual-purpose poultry breeds can produce 4x more eggs, increase chicken weight by 50%, mature faster, and significantly reduce mortality compared to indigenous chickens.

Opportunity 2: Increased table egg production

This is a largely untapped opportunity to provide scalable, affordable protein with low environmental impact.

- Goldenlay, the largest table egg producer in Zambia, and Irvine's Group sell 150m and 338m eggs annually in Zambia and Zimbabwe, meeting 14% and 70% of local demand, respectively — showing that affordable eggs can be commercialized at scale to low-income consumers (e.g., $10 cents/ egg at Goldenlay).

Opportunity 3: Environmentally friendly by-products

Manure can be used as organic fertilizer, lowering environmental impact while generating additional revenue streams. Additional opportunities around other by-products remain largely untapped (e.g., organ meat, waste oil, manure, feathers).

- Both Goldenlay and Irvine's Group transform manure into fertilizer. Irvine's Group transforms hatchery and abattoir waste into animal feed.

Notes: (1) Any advancements in productivity needs to be balanced with considerations of animal welfare when intensifying poultry farming. Under Nutritious Foods Financing Facility's animal welfare checklist, fast growing broiler chicken hybrids have an 'elevated' risk level ranking as their modification for production traits heightens anatomical/metabolic disorders. Best practice is to adopt slower growing hybrids that are well adapted to the local climatic, nutritional, disease conditions.

Aquaculture in S&SE Asia: A large, fast-growing market with opportunities to focus on local consumption, improve environmental practices and breeds

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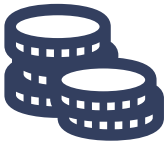

$197Bn production market, the largest producer with ~70% of global production

5.3% projected annual revenue growth through 2030

Minimally processed fish and seafood have high inherent nutritional value and are rich in protein omega-3 fatty acids, and vitamins D and B2

24.6k consumed per person per year, the highest regional average consumption per capita

High average negative environmental impact, with significant variation by species (by a factor of five for GHG), with tilapia having a similar impact to chicken

Feed (especially fish-based) is the main impact driver, along with farm energy requirements

Opportunity 1: Increased local consumption

A growing urban middle class is driving up local demand for aquatic food across the region. Focusing on serving local markets offers a strategic opportunity that can help close this nutrition gap and reduce dependency of producers on international buyers and trade fluctuations.

- Manit Group, a comprehensive Thai aquaculture organisation, is currently exploring B2C channels to serve local customers directly.

Opportunity 2: Environmentally friendly practices with blue carbon financing

Practices including polytrophic culture, mangrove restoration and sustainable sourcing can significantly reduce aquaculture's environmental impact, offering blue carbon financing opportunities, while improving productivity for smallholder growers.

- Blueyou, a seafood company implementing restoration and sustainable fisheries programs across LMICs[1], restores degraded ponds with mangroves resulting in seafood production that is entirely free of feed, fertilizers, and chemicals and multiplies productivity by four. Its sustainable sourcing programs avoid sourcing from overfished stocks and prioritize capture gears and traditional, community-based methods.

Opportunity 3: Improved breeds

Improved breeds with enhanced survival, growth and yield represent an opportunity to boost productivity and incomes of smallholder growers.

- Manit Group offers tilapia breeds which have higher survival and growth rate as well as higher yield than most alternatives on the market (e.g., the average yield of fillet is 36% for Manit group, vs 25-30% average).

Notes: (1) Low- and middle-income countries.

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