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# **Agriculture & Health are Inseparably Linked in Work Towards Sustainable & Economic Development**

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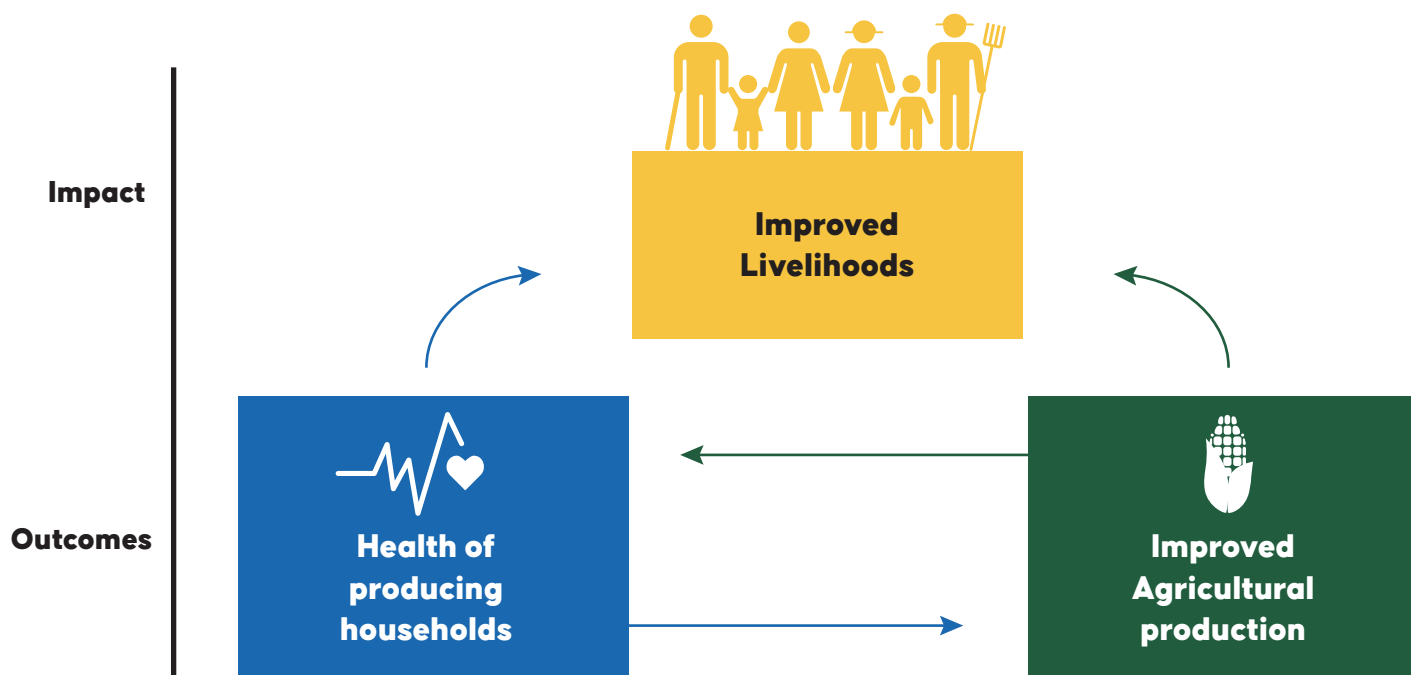




## Agriculture & Health

Poverty reduction and the improvement of livelihoods in low- and middle-income countries are crucial targets in the work towards the Sustainable Development Goals (SDGs). These impact targets are the centre of many sustainable, fair, and equitable economic development models and interventions pursued by international policies and global value chains. Agriculture is often seen as a key engine driving the change needed to achieve these goals (Christiaensen, et al., 2011). This is no surprise. A considerable share of the economies of low- and middle-income countries (LMICs) comes from agriculture. In 2020, agriculture represented, on average, about 23% of sub-Saharan Africa's GDP, 13% of Latin-American and Caribbean, and 18% in South & Eastern Asian LMICs (World Bank,

2021). In the design and facilitation of policies and interventions seeking to improve livelihoods through agriculture what is often overlooked, however, is that farmers can only produce more and better if they are healthy. The effects that any agriculture-centred policy or intervention have on livelihoods and poverty reduction are influenced by the health of farmers and the members of their households (Figure 1). These effects between agriculture and health are inseparable and bidirectional (Lipton, et al., 1988; Hawkes & Ruel, 2006). This means that not only the health of farmers affects agriculture but that interventions focused on improving livelihoods through actions to secure farmer health will also be influenced by the agricultural production practices they are able to apply (Hoddinott, 2012).



**Figure 1. In LMICs, the livelihoods of producing households are influenced by both agricultural practices and the health of farmers. These are bi-directional links between agriculture and health. Results from work to improve livelihoods through either of them will compound the effects agriculture and health have on each other.**

Agriculture and health are the foundations of resilience for many households in LMICs. Understanding these interactions and including them in public and private sector strategies and policies is crucial to support effective work on improving livelihoods and reducing poverty.

The links between agriculture and health are well known. Lipton and Kadt (1988) published a WHO report on the health impacts of agriculture, outlining the nature of the links and policy recommendations. Since then, frameworks and research agendas have been published, emphasizing how good health and productive agriculture are essential drivers of poverty reduction (Hawkes & Ruel, 2006; Dangour, et al., 2012; Hoddinott, 2012). The WHO Regional Committee for Europe adopted the Health 2020 framework, committing to developing integrative policies and identifying the agricultural sector as key to derive synergies for better agriculture and health outcomes (World Health Organization, 2015). These synergies are also recognised in the 2030 Agenda for Sustainable Development (United Nations, 2015). To date, nonetheless, explicit inclusion in international and LMICs development models as well as private sector-led strategies lags behind. We argue that, with producing regions experiencing an increasing

number of stressors on such as climate extremes and emerging (zoonotic) diseases, development and agricultural policies and strategies must move away from productivity-centred models into approaches that account for the inseparable effects health and agriculture have on the livelihoods of farmers and their households.

In this position paper, we present a framework to account for the links between agriculture and health in LMICs. It is aimed at supporting public and private sector donors as well as practitioners in the design of strategies, interventions, applied research, and action towards strengthening the resilience of farmers and households by improving agriculture and health. The framework is built upon four impact pathways that reflect the main interconnections between health and agriculture found in the existing academic and grey literature.



# Working Definitions

In the paper, within health of farmers and household members we include “the state of complete physical, mental and social well-being and not merely the absence of disease or infirmity” (World Health Organization, 1946). The health risks commonly associated with agriculture or that have an influence on agriculture include: nutrition and healthy diets; communicable and non-communicable diseases; occupational hazards and injuries; sexual and reproductive health; and mental health (Lipton, et al., 1988; Hawkes & Ruel, 2006; Dangour, et al., 2012; Hoddinott, 2012; McDermott & Grace, 2012; Rohr, et al., 2019). We follow this standard definition of health and wellbeing because it comprises of measurable outcomes: presence or absence, risk or exposure to disease and injuries. Nonetheless, there may be cases in which the use of the “positive health model” fits best, conceptualizing health as a combination of biological and functional metrics as well as the perceptions of individuals regarding their own health and well-being (Seligman, 2008).

Agriculture is linked to health through activities and processes operating at system, production, and output level (Hawkes & Ruel, 2006). At the agricultural system level, the links with health are shaped by commodity type, practices, and technology used or endorsed as part of, for example, global value chains and development policies. The production level focuses on farmers. At this level, the links are shaped by the production of self-subsistence food crops as well as by the production of commercial, globally traded crops such as soy, rice, coffee, and cocoa. Linkages at agricultural output level include those related to the distribution and consumption of unsafe, contaminated food, as well as to the quality and diversity of available food in local and international markets. To develop a framework on agriculture and health links, we focused on the production level, that is, on producing households. A household is a group of people who often live in the same housing unit or in connected premises and have common arrangements for cooking and eating their food. It can consider a single person as well as spouses, their children, relatives, and others (United Nations, 2008).

Producing households are those households whose means of securing the necessities of life rest significantly on agriculture. In LMICs, they are often

found in rural and peri-urban areas. For producing households, agriculture has a direct impact on nutrition, income creation, natural resources management and environmental sustainability, all of which are determinants of health (Hawkes & Ruel, 2006). For them, anything that affects agriculture has the potential to affect health and nutrition, and anything that affects health and nutrition has the potential to affect agriculture (Hoddinott, 2012). At this scale, plenty of sustainable economic development and health interventions are currently being designed and implemented. This particular focus is, we believe, a crucial scale to consider the links between agriculture and health in the design of strategies, policies, and, ultimately, effective interventions.

Workers are a key part of agriculture in LMICs. These include communal workers and sharecroppers, permanent and temporary migrant workers. Although they do not fall within the definition of household above, they experience first-hand the occupational hazards and benefits of working in agriculture (Asenso-Okyere, et al., 2012). We included this in our framework by considering the effects of health on agricultural labour, regardless of whether workers are members of the producing household or not.

Producing households are not isolated units, but part of communities. The relationships between people in the community can influence how health is viewed, the type of treatments sought for different conditions, as well as how a given producing household copes with sudden, unexpected events. Additionally, producing households in a community are connected through the surrounding environment. Any negative changes to the environment from one producing household can affect others. Though in our framework, we focus on producing households and their intra-household dynamics, these links to their communities can be included through participation in agricultural labour as well as through changes in the environment.



# Strengthening Agriculture & Health for Resilience

Through critical analysis of previous academic and applied work, we developed a framework upon pathways through which health and agriculture are inseparably linked in producing households in LMICs. We named it the Strengthening Health & Agriculture for Resilience (SHARE) framework because, for producing households in LMICs, the links between agriculture and health underlie their resilience. We saw a need for a framework that captures the main interlinkages between agriculture and health in simple pathways. We believe that in doing so, the SHARE framework can help public and private-sector donors as well as decision-makers in design strategies and policies that approach poverty reduction and livelihood improvement by working on strengthening resilience.

The SHARE framework differs from others in that it encapsulates bi-directional links in four pathways that can be understood and represented as separate or interdependent causal chains operating at the producing household level. These pathways, though synthesized, allow further expansion or contextualisation. This feature of the framework, along with its simplicity, can help decision-makers in the design of strategies and policies by providing

foundations on the agriculture and health outcomes and how they can influence each other. Another advantage of the SHARE framework is the use of outputs and outcomes that can be measured through existing, standardised metrics. In practice, the pathways can be transformed as a result of measurement chains and theories of change in the development of monitoring and evaluation frameworks.

The impact pathways in the SHARE framework are:

- **Farmer health & agricultural labour:** The health of farmers, their households, and workers influence the labour and other agricultural inputs that they can apply for agricultural production.
- **Agricultural practices & health:** Agricultural practices affect the health and safety of farmers, their households, and workers directly or indirectly, through their effect on the environment.
- **Agricultural production & food security, nutrition and healthy diets:** Agricultural production influences the food security, nutrition, and healthy diets of farmers and their households.
- **Health & household resources:** Poor health and morbidity have long-lasting consequences in the household's amount and allocation of resources for different activities, including agricultural production.

In the next sections, we will discuss each of the four pathways. We will explain the main underlying relationships and effects with examples from published work.



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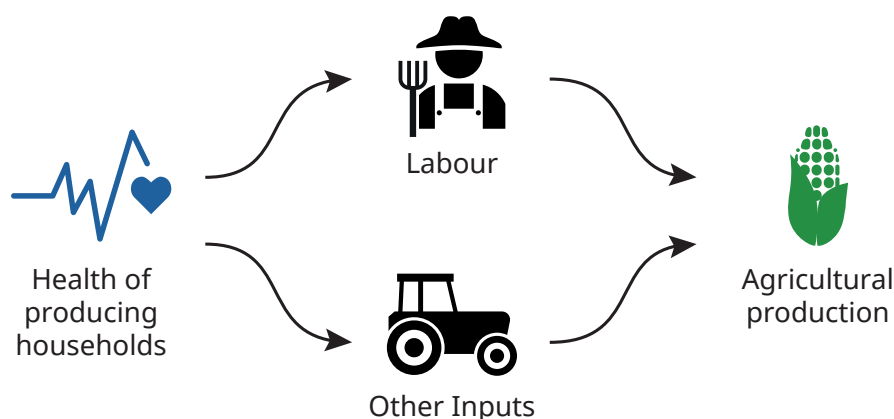
# Farmer health & agricultural labour

The first impact pathway in the SHARE framework represents the effects of farmer and household health on agricultural labour and productivity. The basic propositions are that 1) healthy farmers can work on their land and, when the time comes, harvest crops; and 2) healthy farmers may face less difficulties learning and implementing new practices geared towards boosting agricultural yields. This pathway reflects how injuries, disabilities, other acute and chronic conditions, or illnesses of farmers and household members—derived from agriculture or other sources—affect the capacity to labour in the field and, hence, their level of production (Figure 2).

The positive and negative effects in this impact pathway have been found in conceptual and empirical studies (Cole & Neumayer, 2006; Kwadwo, et al., 2011; Arsyad, et al., 2019; Walton, et al., 2020a). For example, studies on malaria in agricultural households have shown how an increased incidence of the disease increases the absenteeism and mortality of household members who labour on the land (Asenso-Okyere, et al., 2011). This reduces the number of farmers, as well as, the time they can spend preparing the land, sowing seeds, applying good agricultural practices, and harvesting. This can have direct, short-term negative effects on how much a household produces and the income they can derived from agriculture (Lipton, et al., 1988; Hawkes & Ruel, 2006; Kwadwo, et al., 2011; Asenso-Okyere, et al., 2012; Dangour, et al., 2012).

The nutritional status of farmer and household members also influence agricultural labour and productivity (Arsyad, et al., 2019; Berha, et al., 2021). Poor diets and malnutrition can affect the physical productivity of farmers due to illness and fatigue. It also makes household members more susceptible to other health problems, such as injuries and diseases. These factors have a negative effect on agricultural labour and productivity in the short term. In addition, these factors can manifest through various pathways and result in long-term negative health impacts (such as stunting or non-communicable diseases), which can prolong the negative effects on labour and productivity. This effect of health on agricultural productivity has been part of calls to action in the cocoa, coffee, and tea sectors for more comprehensive interventions (van Dorp, et al., 2013a; 2013b; de Vries, et al., 2013).

Many sustainable development strategies, models, and projects focus on the improvement of agricultural production, or its agro-chemical driven intensification as means to reduce poverty and improve livelihoods (Trimmer, et al., 2017). It is important that public and private sector donors, policy and decision-makers consider that, if disease or poor nutrition afflicts farmers and households, their ability to adopt any new practice as well as their labour capacity will likely be reduced (Asenso-Okyere, et al., 2011). Donors and policy makers must consider farmer and household health in the design and implementation of models and interventions interested in improving and enhancing agricultural production.



**Figure 2. Farmer health & agricultural labour pathway in the SHARE framework.** The health of farmers and household members affects the agricultural labour they can perform, as well as the types of inputs they can apply in the field. This influences a household’s agricultural productivity and the income derived from it.



# Agricultural practices & health

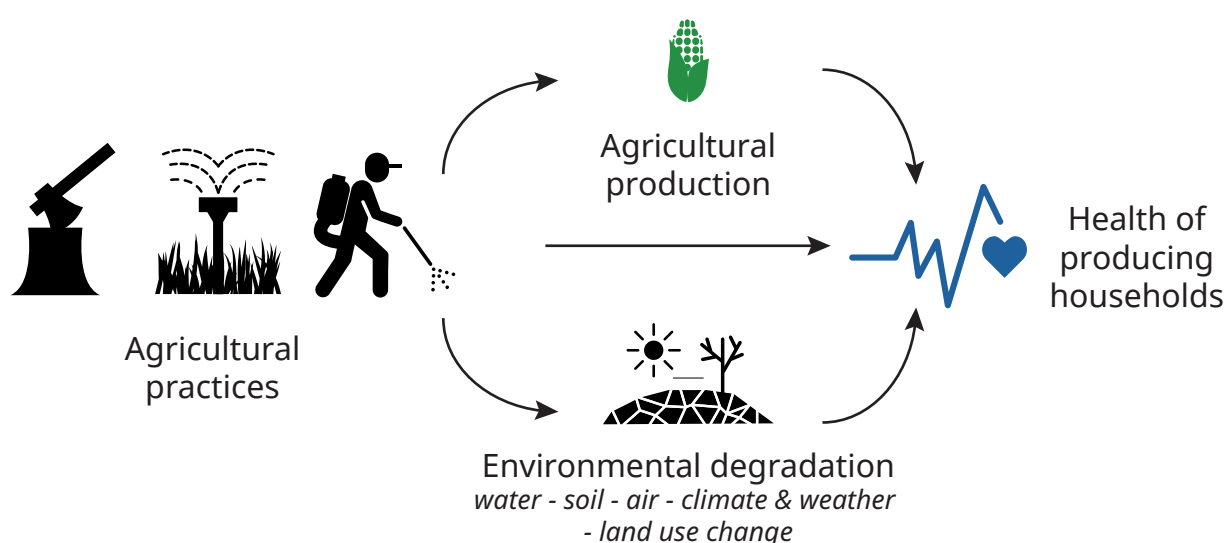
The second impact pathway in the SHARE framework covers the effects agricultural practices have on farmer and household health. Within agricultural practices we consider the methods, inputs, tools, and technology applied before, during, or after cultivation and sowing to improve and secure agricultural production. Agricultural practices include the use of agro-chemicals, tillage, burning, irrigation, weeding, post-harvest practices, among others. The effects agricultural practices on farmer and household health and safety can be positive or negative as well as direct or indirect (Figure 3).

The direct effects of agricultural practices on farmer health include those interventions that reverse, mitigate, or inadvertently increase the exposure of farmers and households to agro-chemicals and disease vectors from encroachment (Lipton, et al., 1988; Hoddinott, 2012; Rohr, et al., 2019). These effects are common. Sustainable development interventions often target the agricultural practices of producing households. This change in practices can stop or reverse the direct exposure of farmers to agro-chemicals by, for example, endorsing and promoting the use of personal protective equipment (PPE) or safer alternatives.

Changes in agricultural practices can also help producing households focus and improve their production without expanding their cultivated land through the conversion of natural or semi-natural ecosystems. Such changes in practices support safe and improved agricultural productivity and can decrease health risks for producing households.

Agricultural practices solely focused on increasing productivity can lead to negative effects on health. This is illustrated with a classic example: the health impacts of the unprotected use of agro-chemicals inputs such as pesticides, fertilizers, or preservatives all of which can cause acute and chronic toxicity from direct exposure (Ngowi, et al., 2007; Asenso-Okyere, et al., 2012). Other practices such as the development of large irrigation networks can lead to an increase abundance of vectors and hosts of human pathogens (Rohr, et al., 2019). Farmers can face a higher risk of mosquito-borne diseases such as malaria, lymphatic filariasis, and schistosome infections.

The indirect effects of agricultural practices on health include the improvement or decrease in sanitation and hygiene practices as well as the increase or avoided exposure to infectious diseases from encroachment into natural areas. Indirect effects include those mediated through reversing, mitigating, or increasing the degradation or pollution of water, air, soil, and ecosystems surrounding the producing households and communities where they



**Figure 3. Agricultural practices & health pathway in the SHARE framework.** Agricultural practices can have both direct and indirect effects on farmers' and households' health. Agricultural practices such as land conversion, irrigation, and agro-chemical application can directly influence health through increased exposure to disease vectors and toxic chemicals, respectively. Environmental degradation includes the erosion or depletion of water resources as well as the pollution or contamination of air, water, and soils.

live (Hoddinott, 2012; Trimmer, et al., 2017; Rohr, et al., 2019). Water can be indirectly contaminated with agro-chemical laden run-off (Mendes, 2021); air can transport fine particulate matter from slash-and-burn practices and trigger respiratory disease (Schenker, et al., 1999; Dennekamp & Abramson, 2011). Encroachment of agricultural and livestock production into natural frontiers can increase the risk of exposure to disease vectors and parasites (Castro, et al., 2006; McDermott & Grace, 2012; Souza, et al., 2019). Landscape modifications can increase the risk and exposure to natural hazards such as landslides, wildfires, and floods, which would affect the resources, health, and safety of many households in the community.

The production of cash crops such as coffee and cocoa is often intensive and time-sensitive, requiring temporary migrant labour. This can bring about further health conditions and risks related to labour conditions. Temporary migrant labour may increase the risk of communicable diseases, including sexually transmitted diseases, as migrant workers

can be followed by or resource to sex workers (Asenso-Okyere, et al., 2012). Moreover, temporary migrant workers often sleep rough or in improvised facilities during harvest time and have limited access to proper sanitation and hygiene measures. This may increase the risk of injuries, accidents, exposure to agro-chemical inputs; poor sanitation and hygiene; high-stress environments; and labour conditions conducive for physical, verbal, and sexual harassment or abuse.

Understanding and measuring the impact of interventions seeking agricultural development through the promotion of certain practices must account for the positive and negative, direct and indirect, effects they have on farmer and household health. Agricultural practices affect health just as health affects labour and the sought-after productivity. If policies and interventions want long-term improvements in agricultural production, they must account for the health of the farmer as well as the potential environmental and health effects of the agricultural practices promoted.





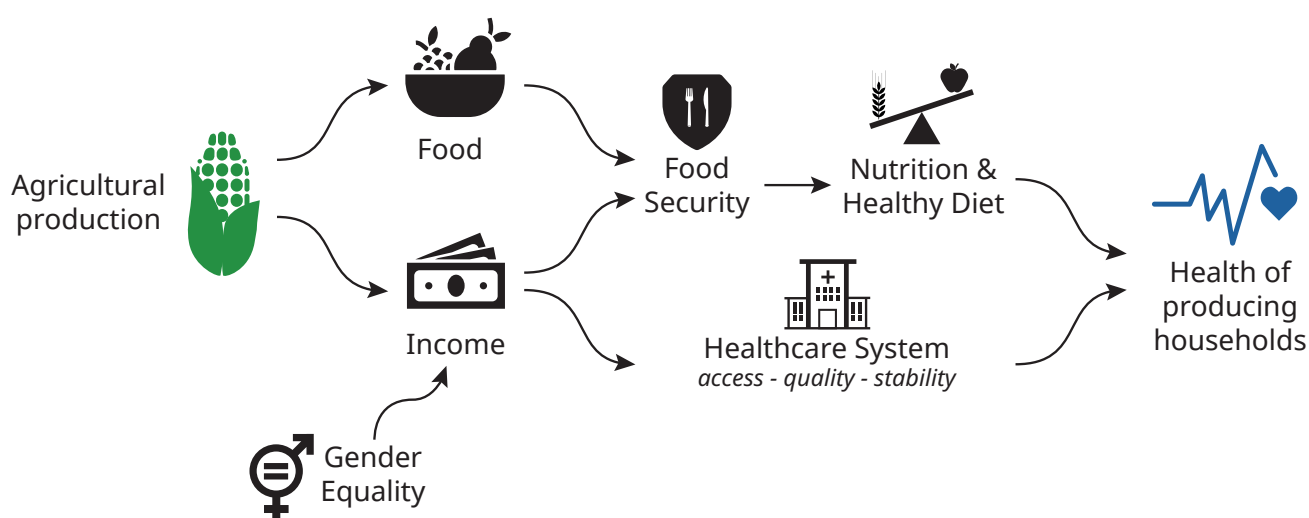
# Agricultural production & food safety, nutrition, and healthy diets

The third impact pathway in the SHARE framework represents the effects that agricultural production have on food security, nutrition, and healthy diets of producing households (Figure 4). Safe and improved agricultural production in a household can increase the availability and quality of food grown for sale and for own consumption. Agricultural development may also result in the introduction of new or fortified foods crops into the diets of a household, which has a positive, direct effect on the food security, nutrition, and healthy diets of producing households.

Household income mediates positive, indirect effects of agricultural production on food security, nutrition, and healthy diets. Changes in agricultural production can lead to increases in income. This can be used to purchase goods that influence health status. This is particularly true when female household members make decisions on how income is spent (Meinzen-Dick, et al., 2012). Female household members tend to use the (improved) income to purchase more food, a more diverse diet, and higher-quality items that have fewer toxicants or pathogens (Meinzen-Dick, et al., 2012). This decisions can improve the nutritional status of the household and reduce exposure to chemicals and food-borne diseases. Increased income from agriculture can also facilitate or improve access to healthcare services.

This pathway can also help us understand potential negative effects of agriculture on food security, nutrition and diets. Agricultural development focused on cash crops for export may remove household resources and attention from the production of local, traditional food crops with a higher nutritional value. The income from producing the new cash crop may or may not compensate for this loss in dietary diversity. Additionally, a strong reliance on income from cash crops for food makes farmers and households nutrition and health status susceptible to price fluctuations and weather abnormalities that affect crop cultivation. Crop failure due to extreme or unpredictable weather leaves producing households unable to meet their food needs.

We often see that policies and interventions seeking the improvement of livelihoods through agricultural productivity assume a positive effect on food security and/or household nutrition. This jump in causality assumes that the chain of effects presented in the Farmer health & agricultural labour and Agricultural practices & health pathways produce positive outcomes. In practice, these assumptions are seldom corroborated. Though it may seem challenging to monitor and evaluate them because it involves intra-household dynamics and gender empowerment in decision making, doing so it is key to understand changes brought about from implementation—and adapt, if necessary. A combination of standardised empowerment indices, food security and dietary diversity metrics can help provide pragmatic approaches to monitor progress in improving livelihoods through safe and sustainable agriculture.



**Figure 4. Agricultural production & food safety, nutrition, and healthy diets pathway in the SHARE framework.** Agricultural production can have direct and indirect effects on a household's food security, nutrition, and healthy diets.

# Health & household resource allocation for agriculture

This pathway represents how health affects the intra-household dynamics that determine the allocation of resource on different activities, including agriculture (Figure 5). This pathway is key to understanding some of the consequences as well as the long-term effects of the other pathways linking agriculture and health.

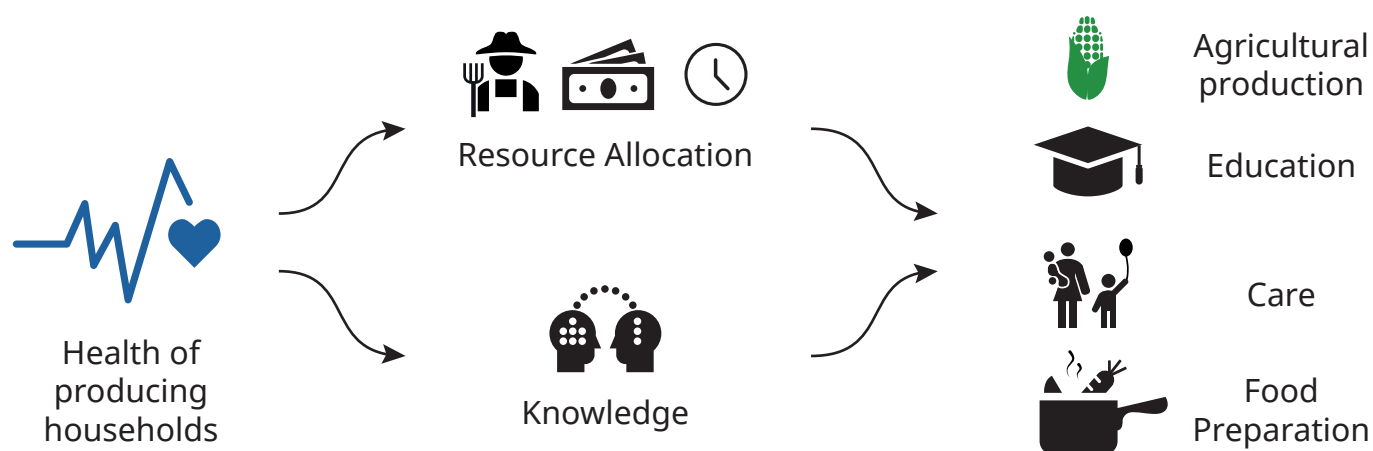
The resources of a producing household can be categorised into capital and time. Capital includes natural resources (such as land), financial assets (such as savings), and human capital (such as knowledge and household labour for agriculture). Time is the resource households can spend on different activities, including caretaking, food production, agriculture, livestock raising, and non-agricultural income-generating activities, such as wage labour and selling handicrafts. Some of the consequences as well as the long-term effects of three impact pathways described before can be understood in terms of how they change intra-household dynamics on these resources.

The responsibility of caring for ill household members and those unable to work falls mostly on women and girls. This diverts time away from other labour-intensive household activities such as food

production, collecting water and firewood, preparing food, housekeeping, and caring for children (Asenso-Okyere, et al., 2012). It can thus affect food preparation and nutrition, sanitation and hygiene in the household. Responding to the illness and injuries of household members unable to work can also incur high medical costs, forcing the household to use of some of their financial capital or to cut back on costs for food and education of youth and children.

When farmers are ill or injured and unable to work on their agricultural production, other household members—usually female, youth, or children—engage in agricultural labour or in the application of input necessary for production (Asenso-Okyere, et al., 2012). This can further divert time investment on, for example, childcare practices that are beneficial to health; while exposing other household members to potentially harmful conditions to their health, safety, and development. This can also increase the prevalence of hazardous child labour in agriculture (Hurst, 2007).

Unaided, the costs of illness and diminished labour on agriculture can have long-term repercussions on a household's financial capital, education, nutrition, psycho-social development, and an overall reduced resistance to disease. Households with unexpected healthcare expenditures may be forced to sell their cash crops early, at lower prices. This reduces their income and may leave the household unable to afford higher quality foods, diverse diets, agricultural inputs for the next growing season, and school fees.



**Figure 5. Health & household resource allocation pathway in the SHARE framework.** The health of farmers and household members can affect intra-household resources and their allocation on different activities such as agricultural production, childcare, education, food cultivation and preparation, among others. These changes in resource allocation and decision making can potentially exacerbate the effects of the other pathways.



Some effects of agricultural practices on farmer health can have lasting effects on household resources. For example, non-lethal, acute pesticide poisoning on household members labouring the land can have long-term neurological and psychological distress symptoms (Farnham, et al., 2021). This is known to impair their physical and psychological capacity for labour and other income-generating activities (Sheahan, et al., 2017). Pesticides and herbicides can contribute to the development of cancer, birth defects, miscarriages, and impaired childhood development (Walker, et al., 2007). The adjustment in intra-household resource allocation to overcome these effects, as well as their consequences, can be felt long after exposure. Contaminated runoff can propagate these serious effects and long-term consequences onto the surrounding communities as well (Lekei, et al., 2014; Farnham, et al., 2021). This undermines the health of producing households and communities as well as their livelihoods.

All the effects on intra-household resource and their allocation discussed previously directly affect food security, nutrition, and healthy diets by diverting time away from food production, food preparation, cooking, and infant and young childcare practices. Loss of income and other financial capital from medical bills to treat acute poisoning, injuries, or infectious diseases from agricultural practices, diverts resources from procuring safe and nutritious diet. At key developmental stages of children and youth this negative effect in nutrition and diets could have long lasting consequences for farmers and households (Broca & Stamoulis, 2003; World Bank, 2006).

An additional long-term effect of poor health and mobility on agriculture is the loss of human capital. The loss of ancestral knowledge and practices linked to the cultivation of crops, medicinal plants, and food (Asenso-Okyere, et al., 2012) can negatively affect what a producing household is able to cultivate and how, how can they treat illness and injuries, as well as the benefits lost because of this.



# The SHARE Framework into Practice

The pathways linking agriculture and health are complex. They operate at various levels and at different time scales. Though we devised boundaries in constructing individual pathways, all of them operate jointly and influence each other. These interactions can be synergic, enhancing any positive as well as negative effects of policies and interventions. In Figure 6, we present the complete SHARE framework. This shows how the elements from each of the pathways interact with each other.

To address the challenges in achieving the SDGs, it is key to generate integrated, multidisciplinary knowledge on the promotion of sustainable livelihoods that considers interconnected factors such as health, agriculture, the environment, and the economics, social and legal factors that influence them. To promote multidisciplinary approaches, we propose the SHARE framework to help public and private sector donors as well as practitioners design and implement action and research. That is, action to help integrating existing knowledge on agriculture and health interactions into the design and implementation of policies and sustainable development strategies; and to support the development of research to fill-in the knowledge gaps on the ways agriculture, health, and other internal and external factors interact and influence the livelihoods and resilience of producing households.

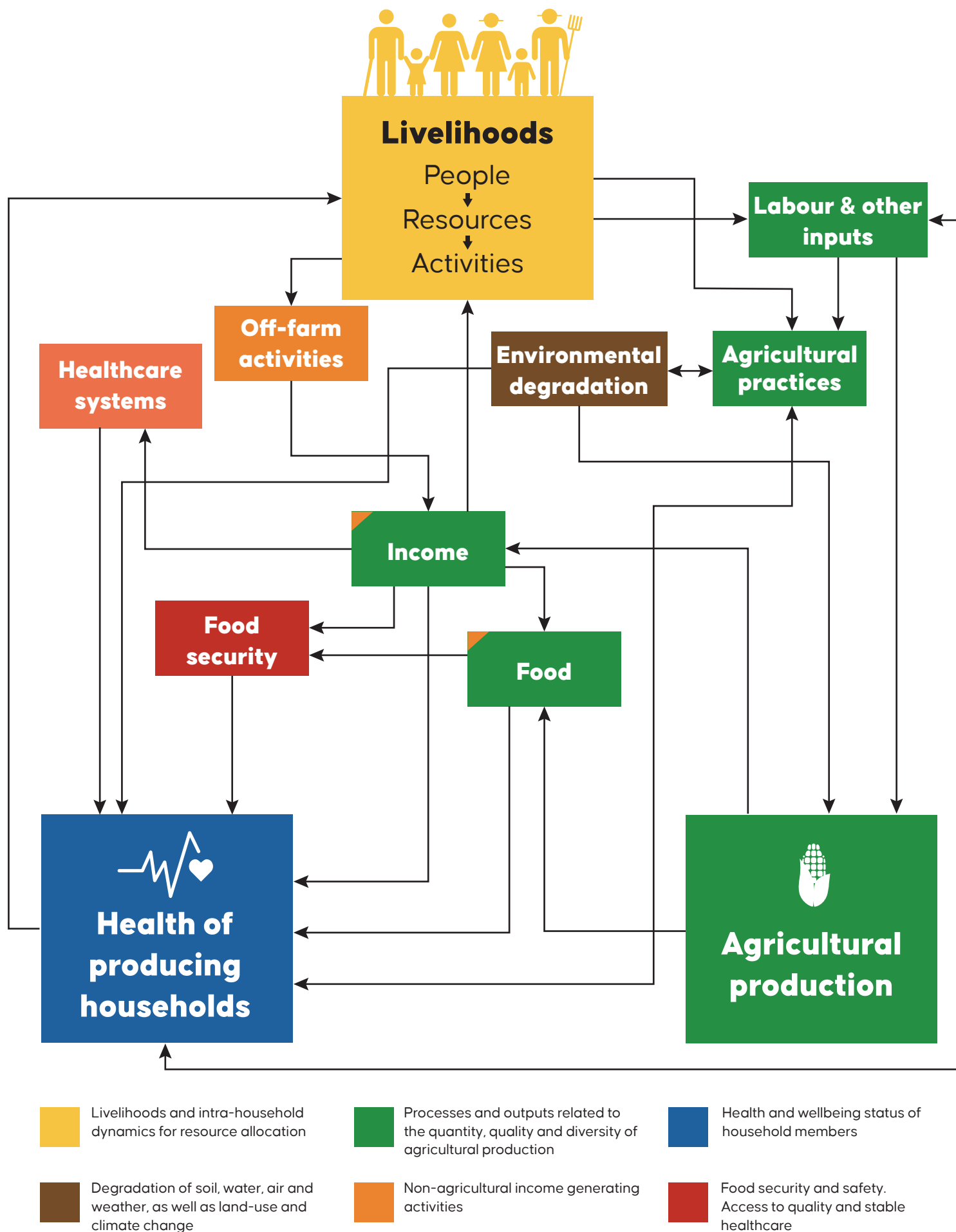
The SHARE framework supports the identification of pathways to achieve impact goals on livelihoods of producing households in LMICs. Public and private sector donors can use the SHARE framework to develop strategies and priorities to support work geared towards improving livelihoods through both agriculture and health. For instance, in recent years, there has been an increased interest and involvement in social impact by the private sector sourcing cash crops such as coffee and cocoa from producing households in LMICs. These companies have developed and implemented programs around productivity to improve livelihoods and, thus, secure their sourcing of quality crops. Often, this type of programs assume that, through improved agricultural practices, income will increase and, thus, livelihoods. In practice, this is seldom a

straightforward path, as we have discussed in previous sections. The SHARE framework can help public and private sector donors look at the goal of improved livelihoods in producing households through a more complete lens than a focus on productivity. It can guide the scoping of needs and risks within their supply chains to strengthen farmer resilience and meet their social impact targets. These needs may not solely be productivity related, but they will influence the type of agriculture producing households in LMICs can perform.

Producing households are susceptible to external factors. External factors include market and global value chain practices. We argue that the effect of external factors can be understood through the SHARE framework (Figure 6). Agricultural and rural development models, value chains practices affect the elements in the framework such as agricultural inputs and practices endorsed by the private sector. Markets and value chain development in LMICs influence the types and varieties of (cash) crops producing households cultivate, the agricultural inputs and labour needed, and the practices they must apply to secure productivity. These prescriptions from external factors influence a household's allocation of resources, income from agriculture, and the effects agricultural practices can have on farmers' health and safety. All of which are elements captured in the SHARE framework. Thus the framework can help shape our understanding of the possible effects of external factors and shocks on health and agriculture.

The effects of shocks on the agriculture and health are a few priorities in a research agenda towards strengthening the resilience of producing households. Shocks include the effect of climatic extremes such as droughts and pandemics. As with the effect of external factors, the SHARE framework can help the identification of the agriculture and health elements influenced by shocks and how that can trigger effects further down the chain of connections between agriculture, health, and the livelihoods of producing households. Nonetheless, the framework is limited by its scale. External factors and shocks influence processes and actors other than producing households. To fully understand the effect of shocks, a broader view of communities and systems is needed.





**Figure 6. The SHARE framework, built upon the four main pathways linking agriculture and health in producing households in LMICs.** The diagram represent the elements of each of the four main pathways discussed in the text and their interconnections.

The SHARE framework can be used as a guide for baseline or scoping studies to understand the risks and opportunities to support producing households improve their livelihoods through agriculture and health. Can the health and nutritional status of farmers sustain the labour productivity needed to increase income from agriculture? Do sanitation and hygiene interventions account for the role of agricultural practices and labour? These lines of inquiry can guide the assessment of risks and opportunities for interventions seeking to improve livelihoods of producing households.

Lastly, multi-disciplinary interventions will need fit-for-purpose monitoring and evaluation frameworks. Each of the pathways in the SHARE framework, can be used by practitioners to derive or complement theories of change and monitoring systems. The SHARE framework can guide the identification of metrics needed as well as how to design evaluation frameworks to understand how much of the change in livelihoods is explained by the different outputs and outcomes.

## Embracing Complexity for Resilience's Sake

Including both health and agriculture and their links in policies and interventions to reduce poverty and improve livelihoods may seem challenging and impractical. Nonetheless, approaches that combine knowledge, methodologies, and tools from different scientific disciplines are not uncommon. Studies have shown that accounting for agriculture-health linkages in the design of interventions can leverage synergies between both outcomes and can lead to greater economic benefits for producing households (Arsyad, et al., 2019; Kassie, et al., 2020; Walton, et al., 2020b). Health and development professionals are aware of these approaches and why they are needed to address complex issues such as ending poverty and improving livelihoods. What we need is a shift in public and private sector donors and policy-makers mind-sets. We need this side of the work towards the SDGs to fully embrace strategies and models that use multi-disciplinary approaches to end poverty and improve resilience in LMICs. This can provide a deep understanding of the key areas to work on and deliver lasting impact.



Photo: Jen Watson



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