Food and Agriculture Organization of the United Nations

INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE
IFPRI

HOW TO INVEST IN FARMERS?
A GUIDE FOR AGRICULTURE HUMAN CAPITAL INVESTMENT PROJECTS

FAO INVESTMENT CENTRE

INVESTMENT TOOLKITS

Investment Toolkits
Number 5

HOW TO INVEST IN FARMERS?
A GUIDE FOR AGRICULTURE HUMAN CAPITAL INVESTMENT PROJECTS

Johanna Gammelgaard IFPRI CONSULTANT
Steven Franzel IFPRI CONSULTANT
Rodrigo Salcedo Du Bois FAO
Ashok Kumar TRANSFORMING RURAL INDIA FOUNDATION
Kristin Davis IFPRI
John Preissing FAO
Katarzyna Pankowska FAO

Published by
the Food and Agriculture Organization of the United Nations
and
the International Food Policy Research Institute
Rome, 2023

Required citation:
Gammelgaard, J., Franzel, S., Salcedo du Bois, R., Kumar, A., Davis, K., Preissing, J. & Pankowska, K. 2023. *How to invest in farmers? A guide for agriculture human capital investment projects.* Investment Toolkits. Rome, FAO and IFPRI. https://doi.org/10.4060/cc4381en

ISBN 978-92-5-137662-1 [FAO]

Cover photographs:
Silhouette of farmer: ©FAO/Riccardo Gangale; Members of Farmer Field School: ©FAO/Luis Tato.

Art Direction and design:
Naz Naddaf

Contents

Tables, figures, and boxes

Tables

Figures

Boxes

© FAO/Atul Loke

©CIFOR/Kate Evans

Foreword

Sustainable agricultural productivity, food and nutrition security and poverty reduction remain top goals of governments and development institutions around the world. Yet, progress is under threat from a variety of crises, including climate change and public health emergencies and their associated economic and environmental shocks.

The transformation to more sustainable, secure and equable agrifood systems needs investments in agriculture, rural infrastructure, natural resource management and climate resilience. However, agricultural investments often prioritize the physical or natural capital of farming communities.

Investing in farmers' education, knowledge, habits, experiences and attributes – or agriculture human capital – is crucial to drive innovation, boost productivity, strengthen farm management and empower smallholders. Building agriculture human capital is fundamental to developing equable, secure, resilient and sustainable farming communities. It is key to successful agriculture and rural development policies.

Beginning in early 2020, the FAO Investment Centre partnered with the International Food Policy Research Institute (IFPRI), with support from the CGIAR Research Program on Policies, Institutions, and Markets (PIM) and the FAO Research and Extension Unit, to examine agriculture human capital investments globally. The goal was to understand how farmers developed their human capital through a variety of initiatives.

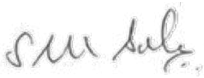
The study shows that investments in developing the human capital of smallholder producers resulted in new technical and business skills and empowered farmers. This led to increased incomes, improved yields and the inclusion of marginalised groups.

As global agrifood systems face ongoing disruptions, challenges and opportunities, agriculture human capital must keep pace. We need more and better investments in innovative and cost-effective programmes to strengthen and measure human capital development.

This toolkit supports investors – including policymakers, government officials, international and national development banks and the private sector – to make sounder investment decisions on projects, programmes, and policies to strengthen farmers' capacities.

We believe this toolkit makes a unique contribution to the agriculture investment landscape. We invite you to use the evidence, strategies, good practices, guidance and recommendations it contains on how to best invest in farmers.

Mohamed Manssouri
Director
FAO Investment Centre



Suresh Babu
Head, Capacity Strengthening
IFPRI

Acknowledgements

This toolkit was written as part of the Agriculture Human Capital Investment Study funded by the Investment Centre of the Food and Agriculture Organization of the United Nations (FAO) with the support of the International Food Policy Research Institute (IFPRI), the CGIAR Research Program on Policies, Institutions, and Markets (PIM) and the FAO Research and Extension Unit.

The following individuals from FAO Investment Centre participated in the preparation of this report: Hubert Boirard, Dennis Escudero, Alessandra Gage, Michael Morris, Luis Dias Peirera, and Kundan Singh.

The authors would like to express their appreciation to Mohamed Manssouri (FAO Investment Centre) for his support. They also thank Delgermaa Chuluunbaatar (FAO), Deborah Duveskog (FAO), Marie-Aude Even (International Fund for Agricultural Development), Priti Kumar (World Bank), Jaap van de Pol (FAO Investment Centre), Kundan Singh (FAO) and Francisca da Silva Torrealba del Pilar (independent consultant) for reviewing the toolkit.

Abbreviations and acronyms

AHC	agriculture human capital
AHCI	agriculture human capital investment
APS	Ajivika Pashu Sakhis (livestock friends)
BMMU	Block Mission Management Unit
CBA	cost-benefit analysis
CEA	cost effectiveness analysis
CF	conversion factor
CIC	Community Implementation Committee
CSP	community service providers
DMMU	District Mission Management Unit
EA	economic analysis
EAS	extension and advisory services
EFA	economic and financial analysis
ENPV	economic net present value
EOCK	economic opportunity cost of capital
FA	financial analysis
FAO	Food and Agriculture Organization of the United Nations
FFS	farmer field schools
FIRR	financial internal rate of return
FNPV	financial net present value
FTC	farmer training centre
FTFE	farmer-to-farmer extension
GFRAS	Global Forum for Rural Advisory Services
GPS	global positioning systems
ICT	information and communication technology
IFAD	International Fund for Agriculture Development
IFPRI	International Food Policy Research Institute
IIA	integrated investment appraisal
INIA	Instituto Nacional de Innovación Agropecuaria (National Institute of Agriculture Innovation)
IPA	Innovations in Poverty Action
IRR	internal rate of return
JOHAR	Jharkhand Opportunities for Harnessing Rural Growth
JSLPS	Jharkhand State Livelihoods Promotion Society
MAFF	management advice for family farms
M&E	monitoring and evaluation
MT	master trainers
NGO	non-governmental organization
NPV	net present value

NRLM	National Rural Livelihoods Mission
PDO	project development objective
PG	producer group
PO	producer organization
RCT	randomized controlled trial
SMMU	State Mission Management Unit
SNIA	Sistema Nacional de Innovación Agropecuaria (National System of Agriculture Innovation)
SWOT	strengths, weaknesses, opportunities and threats
ToC	theory of change
TSA	technical support agencies
VO	village organization
WOP	without project scenario
WP	with project scenario

Introduction

WHY THIS TOOLKIT

The Food and Agriculture Organization of the United Nations (FAO)'s investment toolkits are designed to provide agricultural investment practitioners and technicians with innovative and proven approaches, tools and best practices. This Agriculture Human Capital Investment (AHCI) toolkit has exactly this purpose in mind, with a focus on helping our target audience (investors such as policymakers, government officials, international and national development banks and the private sector) make sounder investment decisions on projects, programmes, and policies that strengthen farmers' capacities. We believe that this toolkit makes a unique contribution to the investment landscape by focusing on effective and proven tools and processes in human capital, an area that has suffered from underinvestment and attention from government officials, development finance institutions and other actors.

The 2021 United Nations Food System Summit pointed out that to reach the Sustainable Development Goals (SDGs), agrifood systems must transform to be more inclusive and sustainable and provide safe and nutritious food for all (United Nations, 2021). The climate change crisis, COVID-19 pandemic, war in Ukraine and a disruption in global supply chains have further highlighted the importance of resilient agrifood systems. At the same time, digital and precision agriculture technologies, nature-based food and agriculture solutions, and global and national food quality and safety standards provide opportunities to improve the resilience of our agrifood systems and the quality of our foods. At the farm level, this demands that smallholder producers have greater access to information, the ability to adapt and to adopt, and become more empowered to make production, market, natural resource and overall farm decisions. Climate-smart and resilient agriculture requires smart and resilient farmers.

Many actors invest in agriculture but none more than farmers themselves, the greatest source of on-farm investments, including in human capital (FAO, 2012). In fact, farmers invest more than four times the amount of governments in capital stock (including human capital) in their farms than government programmes (FAO, 2021). Additionally, governments, international financial institutions, the private sector, producer organizations and non-governmental organizations (NGOs) contribute to the formation of agriculture human capital through the investments and policies they pursue.

Over the past two decades, trends indicate that limited resources are dedicated to improving farmers' capacities through public and private investments, which is ironic given the increasing innovation and adaptation demands and opportunities in the sector (FAO, 2022a). Many government programmes and investment loans prioritize "hard" investments in physical infrastructure over "soft" investments in human and social capital. Agriculture human capital investments are also at times hidden under broader programme themes, so not always fully accounted for in policies, programmes, and projects as well as private sector decision-making. This means that not only the benefits, but also the costs are not fully accounted. The purpose of this toolkit is to provide the means to effectively plan and advocate for more and better investments in farmers' capacities. Specifically,

we want these investors to be able to explain what agriculture human capital is, give examples of agriculture human capital investment projects, be able to integrate agriculture human capital into a project theory of change, and select appropriate agriculture human capital development methods based on project goals.

HOW THE TOOLKIT WAS DEVELOPED

The FAO Investment Centre along with its partner the International Food Policy Research Institute (IFPRI) embarked on an analysis of AHCI over two years ago. This involved a thorough review of secondary data on AHCI trends and evidence, conducting key informant interviews, undertaking primary research globally on a range of best practices and lessons learned. The analysis showcased other relevant cases as box stories, reviewed the use of economic analysis in AHCI, developed thematic investment briefs and hosted eight global or regional webinars to share findings and gather feedback on the topic. From this body of work, nine case studies, four investment briefs, and a global synthesis report were published, forming the basis of this toolkit. The authors also drew on other findings around investments in agriculture human capital for use in the toolkit.

This toolkit adds to the study synthesis *Investing in farmers: agriculture human capital investment strategies* (Davis *et al*., 2021). This set out to better understand investment in human capital to deal with challenges facing our global agrifood systems, from sustainably feeding the world's growing population with safe, healthy and nutritious food to finding innovative solutions for more resilient and climate-smart agriculture.

This toolkit seeks to address the challenges and opportunities mentioned by providing investment strategies, evidence, good practices, and recommendations for improving the quality and quantity of investments in agriculture human capital – to improve investments in farmers.

HOW TO USE THE TOOLKIT

Throughout the toolkit, there are a number of learning aids. Each module has a *learning objective*, stated at the outset. These are in the form of competencies, something the user should be able to do or perform as a result of reading the module. *Boxes* throughout the toolkit provide more in-depth insights into terms or issues. Each word highlighted in *green* is defined in the glossary.

The toolkit comprises seven modules. Module 1 discusses what human capital is, compares it to other types of capital, and provides concrete examples of human capital investment. Module 2 defines agriculture human capital in greater depth and shares a theory of change for human capital development. Module 3 provides building blocks to consider when designing projects that invest in agriculture human capital. Module 4 contains a series of agriculture human capital development methods, with information about principles, reach, sustainability, ease of implementation and much more. Module 5 comprises two deep-dive case studies into two human capital development projects from India and Peru. Module 6 focuses on economic and financial analysis methods of agriculture human capital investments, providing specific examples. Module 7 provides a set of key messages and recommendations.

Module 1
Agriculture human capital investment: what it is and how to use it

Learning objective

To be able to explain what human capital is and how it differs from other types of capital. At the end of the module you should be able to give examples of investments in agriculture human capital and discuss different ways that actors invest in it.

WHAT IS AGRICULTURE HUMAN CAPITAL?

Human capital includes "the skills, knowledge, ability to labour and good health that together enable people to pursue different livelihood strategies and achieve their livelihood objectives" (DFID, 1999). From an economic perspective, this refers to assets that improve individual productivity and produce economic value (Goldin, 2014). Human capital goes beyond individuals to benefit others and society, across generations (World Bank, 2019). Agriculture human capital applies these concepts to the agriculture and rural development space.

Human capital is one of the five livelihood assets in the sustainable livelihood framework developed by the United Kingdom Department for International Development (DFID, 1999). These assets include natural, physical, financial, social and human capital (Box 1.1).

BOX 1.1

DESCRIPTION OF FIVE TYPES OF CAPITAL

The five types include:

1. human – health, education, knowledge, skills;
2. natural – land, water, soils, livestock, trees;
3. financial – cash or other financial assets like pensions;
4. physical – planned infrastructure, tools;
5. social – network of relationships, group membership.

Human capital is inextricably linked to the other kinds of capital. It is needed to better manage natural and financial capital, to use physical capital, and to build social capital. Strengthening human capital thus adds value to other types, leading to better livelihood outcomes. The close connection between an empowering learning process and enhanced well-being indicates that improving human resources among poor farmers is an important element in broader rural development (Friis-Hansen and Duveskog, 2012).

SOURCE: DFID. 1999. *Sustainable livelihoods guidance sheets*. London, DFID.

This toolkit focuses on human capital in *agriculture* (including livestock farmers, fisheries and forestry). We define agriculture human capital as the skills and capabilities of agricultural producers to successfully manage agricultural enterprises – the toolkit focuses on small-scale producers. Agricultural producers here include farmers, pastoralists, foresters and fisher folk and are mainly referred to as farmers or producers interchangeably throughout the toolkit. Capability, according to economist and philosopher Amartya Sen, is the ability to perform certain basic functions in life. Agriculture human capital also includes more abstract aspects relating to livelihoods in a broader sense, such as self-esteem, empowerment, creativity, increased awareness and attitudes or mindsets. Agriculture human capital thus can be developed or improved. Throughout the toolkit we use synonyms such as capacity, skills development, education and farmer learning for *agriculture human capital development*. We define key terms in Box 1.2.

BOX 1.2

DEFINITIONS OF AGRICULTURE HUMAN CAPITAL

There are many terms for human capital, covered in more depth in Module 4.

- **Knowledge:** The theoretical or practical understanding of a subject through an active learning process.
- **Skills:** Expertise which is often occupation-based and focused on competencies for economic value. The expertise may be technical, functional or business related.
- **Education:** Expertise in a discipline by undergoing systematic instruction and learning, especially at a school or university.
- **Empowerment:** A process that increases the capacity of people to make choices and to influence collective decisions towards desired actions (Danida, 2004).

SOURCE: Authors; Danida. 2004. *Farmer empowerment: Experiences, lessons learned and ways forward.* Copenhagen: Technical Advisory Services Danida.

Social capital can be an important link to human capital, as in the case of capacity development initiatives in Cameroon and Côte d'Ivoire (Gordon, 2021). The toolkit focuses on *individual* human capital, however, and specifically, that of agricultural producers.

Agriculture human capital *investment* involves putting finances, time and other resources into strengthening the skills and capabilities of agricultural producers. The most important investor in agriculture human capital are farmers themselves who invest in many ways; however, many other actors play key roles. Governments, international financial institutions, farmer organizations, the private sector and civil society all invest in human capital development for different reasons. Some projects and programmes seek economic returns such as higher productivity or increased incomes. Others aim to empower or increase the agency of small-scale producers. Human capital development initiatives often contribute to larger project goals. For instance, a project intending to expand farmers' market linkages may invest in human capital by training farmers in market analysis. Other investors focus entirely on human capital development. For instance, the Government of Ethiopia invested heavily in farmer training centres in the 2000s (Wordofa and Sassi, 2018). Government investment in basic education is an important means of improving producers' human capital and also improves producers' capacity to benefit from other interventions, such as training in market analysis and farmer training centres.

Human capital development goes beyond just developing technical skills. Box 1.3 shows skills developed through a project highlighted in Module 5.

BOX 1.3

DEVELOPMENT OF TECHNICAL, SOCIAL AND MANAGERIAL SKILLS UNDER JHARKHAND OPPORTUNITIES FOR HARNESSING RURAL GROWTH PROJECT (JOHAR) IN INDIA

The master trainers (MT) working in the JOHAR project are women smallholder farmers aged 28–34 with 10–15 years of formal education. MTs train community service providers and farmers in livestock management. MTs receive 34 days of training under JOHAR. One of these is a six-day residential training session covering adult learning and human values. They also learn about livestock rearing practices, financial practices and facilitation skills. MTs must pass certification exams set by the Agriculture Skills Council of India.

The human capital gained provides opportunities for women to improve their livelihoods. One MT successfully started a poultry enterprise, and with the enhanced earnings and knowledge she is now the major decision-maker in her house. MT self-esteem and confidence were also enhanced. Many reported improved abilities to speak publicly, as well as better listening skills and empathy.

> "I am an educated person, but I could not use my education in the village; now I read a lot about animal rearing and treatments, keeping an account of income and expenses, training the [community animal health service providers] and operating laptops" declares one MT.

SOURCE: Kumar *et al.* 2021. *Investing in women livestock advisers and farmers – Jharkhand Opportunities for Harnessing Rural Growth Programme in India.* Rome, FAO and IFPRI. https://doi.org/10.4060/cb7116en

EXTERNAL INVESTMENT IN AGRICULTURE HUMAN CAPITAL

Less than 0.2 percent of total international development finance between 2015 and 2018 specifically targeted agriculture education, training and extension (Davis *et al*., 2021 based on OECD data and Atteridge *et al*., 2019). However, it is difficult to know the exact amounts since human capital goes by many terms and the proportion of funding that specifically targets human capital elements is often not explicit. It is similarly difficult to understand exactly how much is invested domestically through national or sub-national government budgets.

There are different types of human capital investment approaches. Typical or traditional projects are financed, at least in part, through an international financial institution with an implementing partner such as the government or a non-governmental organization (NGO). These projects typically have a set, relatively short time frame of three to five years.

Usually, human capital is a sub-component of a larger project, such as the World Bank's Maharashtra Project on Climate Resilient Agriculture. The project's aim was to enhance climate resilience and the profitability of smallholder farming systems. One component focused on strengthening the adaptive capacity of smallholders to adjust and modify their production systems to moderate potential future impacts from climate events.

Some projects, however, are standalone human capital investments in agriculture as the main goal. For instance, the International Fund for Agricultural Development (IFAD) Rural Youth Vocational Training, Employment and Entrepreneurship Support Project in Mali supported vocational training and microenterprise development for young people, especially women.

Government programmes often institutionalize human capital development over a much longer period such as decades, as in the case of Haku Winay in Peru (Salcedo du Bois and Zimmerman, 2021), Cameroon's Professional Training Programme in the Agropastoral and Fisheries Sectors (Takamgang and Lhoste, 2021) or Twigiri Muhinzi in Rwanda (Neza *et al*., 2021). Many countries have agricultural universities, colleges and training centres that are critical for strengthening human capital in agriculture. In the late 1990sthe Government of India and the World Bank implemented the Agricultural Technology Management Agency model to facilitate and coordinate farmer-led extension activities (Reddy and Swanson, 2006).

NGOs and the private sector also provide extension services that develop human capital. Catholic Relief Services (CRS) has a curriculum called Skills for Marketing and Rural Transformation (SMART Skills) that provides an integrated and sequential approach to strengthening farmer capacity to link up with markets and manage their resources.

In Indonesia, the private company Mars has been training Cocoa Doctor entrepreneurs through a network of Cocoa Development Centres in South Sulawesi. These entrepreneurs provide advice and coaching to 12 000 farmers directly in their villages. Mars also works with eight vocational schools and has established a cocoa curriculum to encourage young people to become involved in cocoa farming and related businesses.

Other examples of human capital investment projects include investment in *nutrition* projects by the World Bank (2020) and IFAD; focusing human capital development on *youth* in Trinidad and Tobago or *Indigenous Peoples* in Brazil and Kenya (Davis *et al.*, 2021; Mwangi *et al.*, 2021). Human capital development can be through *informal* coaching as with the Mondelēz international sustainability programme Cocoa Life or *formal* as with the school-on-air radio certification programme supported by IFAD (Davis *et al.*, 2021).

Current agriculture human capital investment

Agriculture human capital investment focus areas have changed over time. These changes include the *methods or approaches, target groups,* and overall themes and related skillsets. For instance, in 1980s there was more focus on home economics for women on farms and on productivity-enhancing skills. Today, farmer field schools and digital approaches are common. Skillsets for today have greater focus on climate change and entrepreneurship and go beyond a focus on production. Table 1.1 provides a snapshot of investment topics today within agriculture human capital.

Table 1.1
Current focal areas for agriculture human capital investment

Methods and approaches	Target groups	Themes and skillsets
· Various forms of farmer field schools · Digital approaches, information and communication technologies · Community extensionists and lead farmer approaches	· Small-scale agricultural producers · Women · Youth · Landless · Indigenous Peoples · Other actors in the value chain besides producers (transporters, advisers)	· Climate change · Resilience · Agroecology · Nature-positive solutions · Nutrition · Business and marketing skills · Entrepreneurship · Digital tools

SOURCES: Authors' own elaboration.

There are many different ways to invest in human capital in agriculture. Human capital development can and should be part of any investment project, given its linkages to other types of capital (Box 1.1). It strengthens other types of capital and thus investments. However, human capital is difficult to measure adequately in terms of benefits and costs, thus challenging decision-makers and investors to pitch the case for investment (see economic and financial assessment considerations in Module 6).

Whatever the form or the theme of agriculture human capital development, it needs to be thoughtfully defined, designed, implemented, monitored and evaluated. The next sections provide more information about how to do this.

Module 2
Defining agriculture human capital investment

Learning objective

To be able to define and discuss investment in agriculture human capital.

Module 2 presents a set of definitions and categories that can be helpful in conceptualizing agriculture human capital investments (AHCI). This way, we also operationally define concepts that are used later in the toolkit.

DEFINING SUCCESS CRITERIA

As this toolkit aims to provide approaches, tools and best practices for design, implementation, monitoring and evaluation of successful investments in agriculture human capital, we need to first clarify success criteria. We define successful investment in agriculture human capital as:

> a form of intervention that achieves heightened or improved human capital among agricultural producers which is deemed: a) desired; b) appropriate; c) timely; and d) useful in enabling the pursuit of livelihood strategies and eventually desired livelihood outcomes and impacts within agriculture.

Therefore, for AHCI to be successful, human capital should be developed and strengthened and should enable producers to achieve their desired outcomes and impacts.

AGRICULTURE HUMAN CAPITAL INVESTMENT AS A MODEL AND ITS SIX COMPONENTS

Building investments in agriculture human capital requires more than choice or design of development methods. Broadly, it requires the employment of six different, but potentially overlapping, components to form what we call a model of AHCI. These components are: 1) the target group; 2) individual skills providers; 3) development methods; 4) an objective for development in the field of human capital; 5) implementer(s); and 6) funder(s). Figure 2.1 gives an overview.

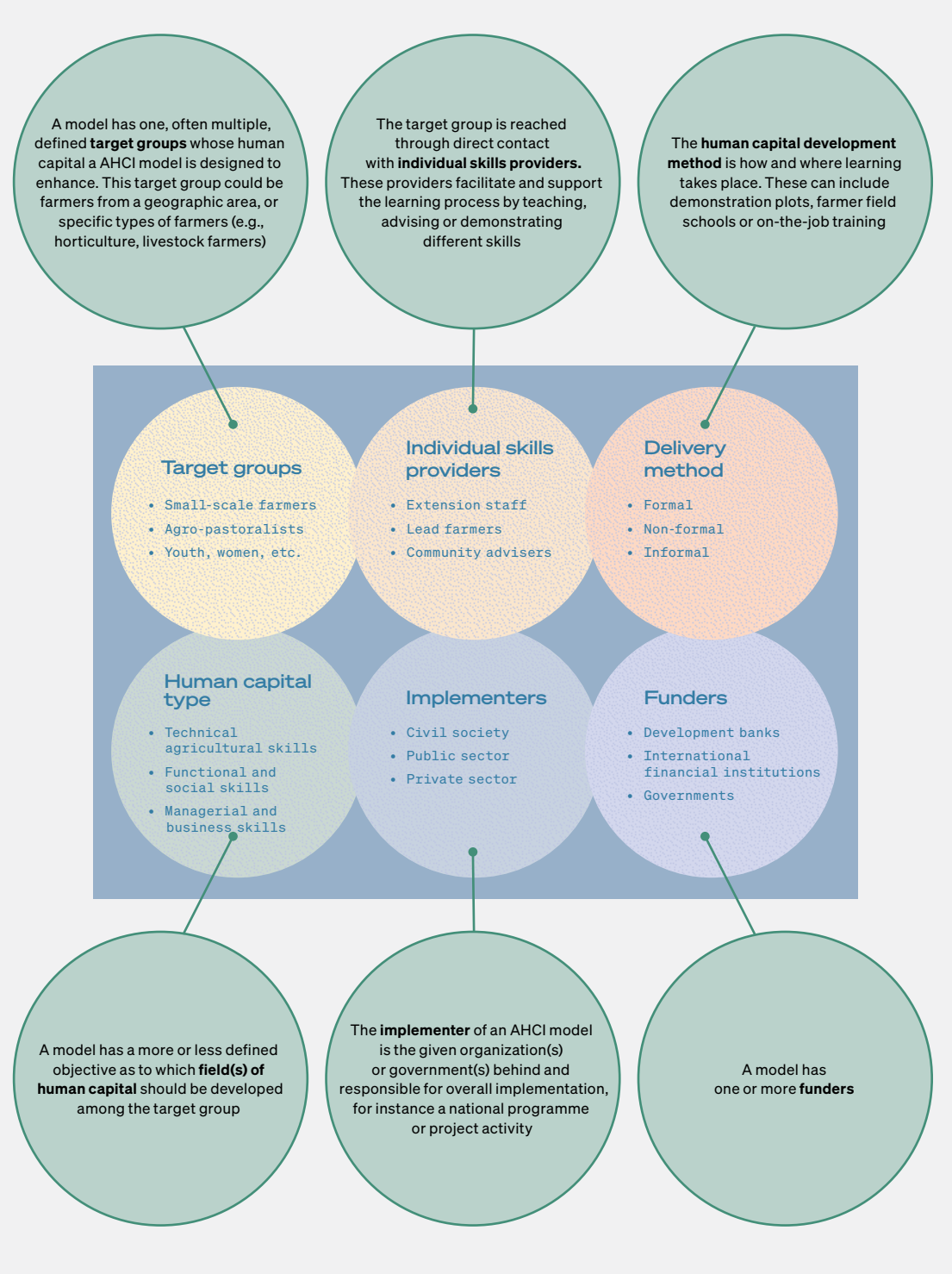


Figure 2.1
An investment model in agriculture human capital and its components

SOURCE: Adapted from Davis *et al.* 2021. *Investing in Farmers: Agriculture Human Capital Investment Strategies.* Rome, FAO and IFPRI. https://doi.org/10.4060/cb7134en

THREE FIELDS OF AGRICULTURE HUMAN CAPITAL

Agriculture human capital implies skills and capabilities within more than just the field of agricultural techniques and practices. Specifically, three different fields are used here, namely: 1) technical agricultural skills; 2) functional skills; and 3) business skills (Davis *et al.*, 2021). Table 2.1 gives an introduction, with concrete examples from case studies in 2020.

Table 2.1
Three fields of agriculture human capital and some examples

AHC field	Focus in the field of AHC	Examples of acquired agriculture human capital within given field
Technical agricultural skills	Often focus on good agricultural practices, i.e. the use of good management principles for agricultural production that do not harm the environment or human health.	Cocoa farmers in Indonesia gained knowledge around agronomy, phytosanitary control, harvest and post-harvest as well as skills in the fields of seeding, grafting, pruning, composting and harvesting.
		Young learner in Cameroon: "The training has changed us, I respect the dimensions [for sowing] and the yields are very, very different."
		Women livestock rearers in India learned about timely vaccination, deworming, castration, animal cleanliness, and provision of feed supplements and clean drinking water for their livestock.
Functional skills	Often relate to skills in communication, leadership, public speaking, negotiation, conflict resolution, **networking**, critical thinking and decision-making. Also include heightened agency and self-confidence. All of these are important for livelihoods dependent on agricultural production.	Learner in the United States of America: "I definitely learned a lot of my soft skills... how to speak in front of people, professionalism, how to network, just all-around people skills... how to talk to different people with different backgrounds than me and try to relate to them and not leave anybody out."
		Indian master trainers learned responsibility, participation, teaching and communication. They were responsible for: training community service providers; preparing venues; planning training content and sub-group activities, tests, feedback forms, and field assignments; logistics, and handling urgent needs of participants. Moreover, due to heightened expertise and self-reliance, they gained higher self-esteem and confidence.
		Women in Kenya were empowered in their household roles. After training in family budgets and gender awareness, many women said that awareness led to a new division of labour that reduced their heavy workload in the home. "After training, he changed. When I am sweeping, he takes the bicycle and fetches water. I realized I had been suffering, working the whole day without resting."
Business skills	Often includes managerial, market, financial and record-keeping skills, but can also entail a shift in mindset to perceiving farming as a business, and the opportunities that brings with it.	In Chile, participants gained management and planning skills, and the ability to follow protocols for monitoring productive activity by keeping registers. One male farmer stated: "sometimes we are a bit reluctant to keep records but we have had to learn to keep a register when, for example, a calf dies".
		Indian female livestock producers gained skills in using markets and value chains, savings and credit, and market analysis. Financial awareness and understanding the economic importance of livestock increased significantly among community livestock service providers. Producers realised that livestock rearing was economically rewarding and less labour intensive than other local opportunities.
		In Kenya, a participant stated: "I have learnt how to make a budget; initially I used to plant without one. Now I use the budget to track how much fertilizer I have used and through the records I can see my profits or losses. Like a planting calendar, I did not know anything about it at all. A problem map and the problems you are likely to meet when farming, on the roads or at the market and how to resolve them. So, I was able to learn that, when you have these problems, you can solve them".

SOURCES: Authors, with edited quotations from Davis *et al.* 2021. *Investing in Farmers: Agriculture Human Capital Investment Strategies.* Rome, FAO and IFPRI. https://doi.org/10.4060/cb7134en

While these are the three overarching fields within which to develop human capital in agriculture they should not be seen as rigid categories. These skills and capabilities can often overlap or be interdependent. For instance, gaining technical knowledge on production can lead to greater self-esteem, which can provide incentives to take on leadership roles and increase functional skills. These should not be seen as entirely separate forms of human capital however, these categories can be useful in discovering: 1) which skills are most needed for a desired impact; and 2) how best to develop those skills. Module 4 addresses this.

THE MANY METHODS OF INVESTING IN AGRICULTURE HUMAN CAPITAL – A TYPOLOGY

Knowing the specifics of how to develop agriculture human capital within one or several of the fields is useful when investing in AHC. We define an AHC development method as systematically applied procedures and techniques to provide information, advice, skills, training, education and other services to producers and to facilitate problem-solving and learning (adapted from David and Cofini, 2017). Examples of common development methods could be farmer field schools or community promoters.

Choosing and designing the best suited development methods is arguably where most of the crucial decision-making occurs when investing in agriculture human capital. Generally, the myriad of existing methods can be divided into three categories depending on their levels of formality (Davis *et al.*, 2021). Figure 2.2 gives an overview of the typology which Module 4 also addresses.

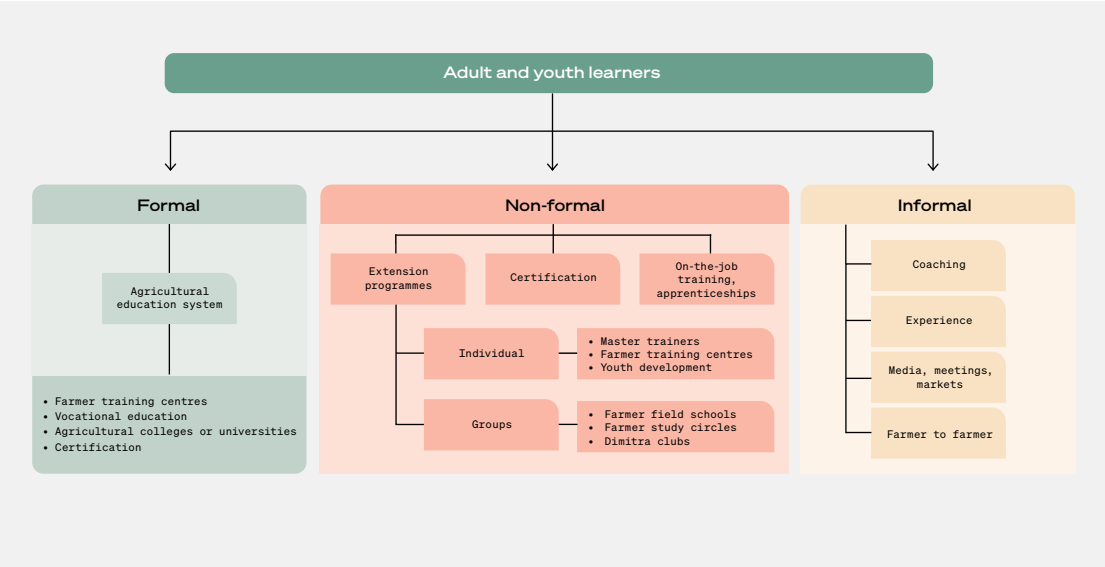


Figure 2.2
Typology of human capital development methods in agriculture

SOURCE: Davis *et al.* 2021. *Investing in Farmers: Agriculture Human Capital Investment Strategies.* Rome, FAO and IFPRI. https://doi.org/10.4060/cb7134en

©CIFOR/Rifky

©Unsplash/Trevor Vannoy

Module 3
Building agriculture human capital through investment

Learning objective

To be able to use the building blocks of agriculture human capital investment and elements of each in programme or project design, analysis, or evaluation.

INTEGRATING AGRICULTURE HUMAN CAPITAL IN A THEORY OF CHANGE

Writing up a theory of change can be useful for any project or initiative. This also applies when investing in agriculture human capital (AHC). A difference here, however, is that AHC is in many cases not the end goal in itself, but a means to reach it. When farmers learn new skills, the hope is that those skills will help solve problems or improve certain conditions which eventually will achieve the wider impacts that are the aims of the project. Therefore, in a theory of change, human capital itself can be seen as an output, rather than the final impact (see Figure 3.1, in yellow).

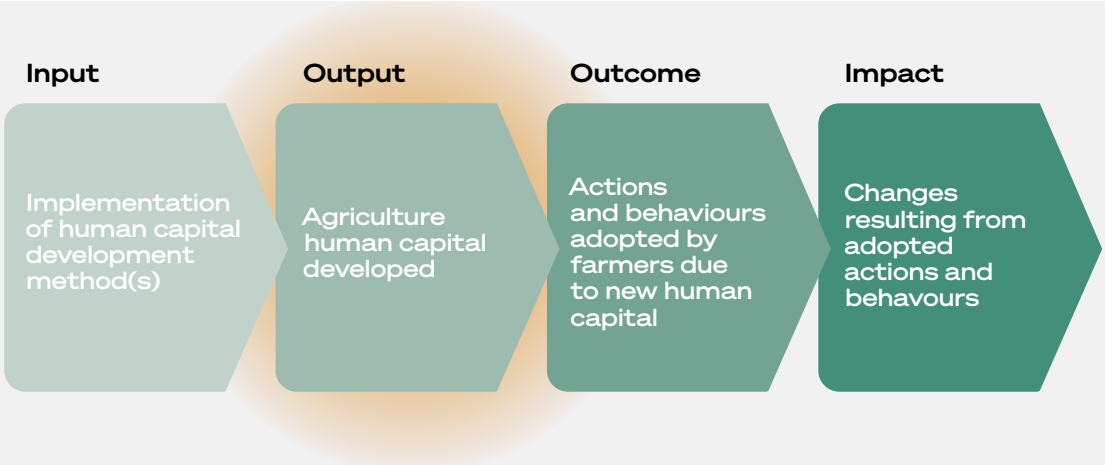


Figure 3.1
Agriculture human capital in a theory of change

SOURCE: Authors, adapted from Davis *et al.* 2021. *Investing in Farmers: Agriculture Human Capital Investment Strategies.* Rome, FAO and IFPRI. https://doi.org/10.4060/cb7134en

The key to successfully achieving the desired impact through investments in AHC is then twofold: first, understand how human capital in agriculture is best developed input -> output; and second, understand how and which kinds of skills and capabilities help farmers to adopt new practices which can eventually lead to the desired impacts output -> outcome -> impact.

THREE BUILDING BLOCKS TO INFORM PRACTICES AND DECISIONS

Building an agriculture human capital investment through programmes or projects requires three building blocks:

1. Understand how and which types of skills and capabilities have the best potential to lead to desired impacts is what we call the **aspirational building block**, because as in a theory of change, these are changes you aspire to make.
2. Understand how human capital in agriculture is best developed; that is, which development methods to apply, how to organize, and create incentives for learning. This we call the **design building block**.
3. The third and equally crucial part is to understand how contextual factors set the frames which make human capital development methods possible and also how they influence outputs, outcomes and impacts. This we call the **framing building block**. Figure 3.2 summarizes these three building blocks.

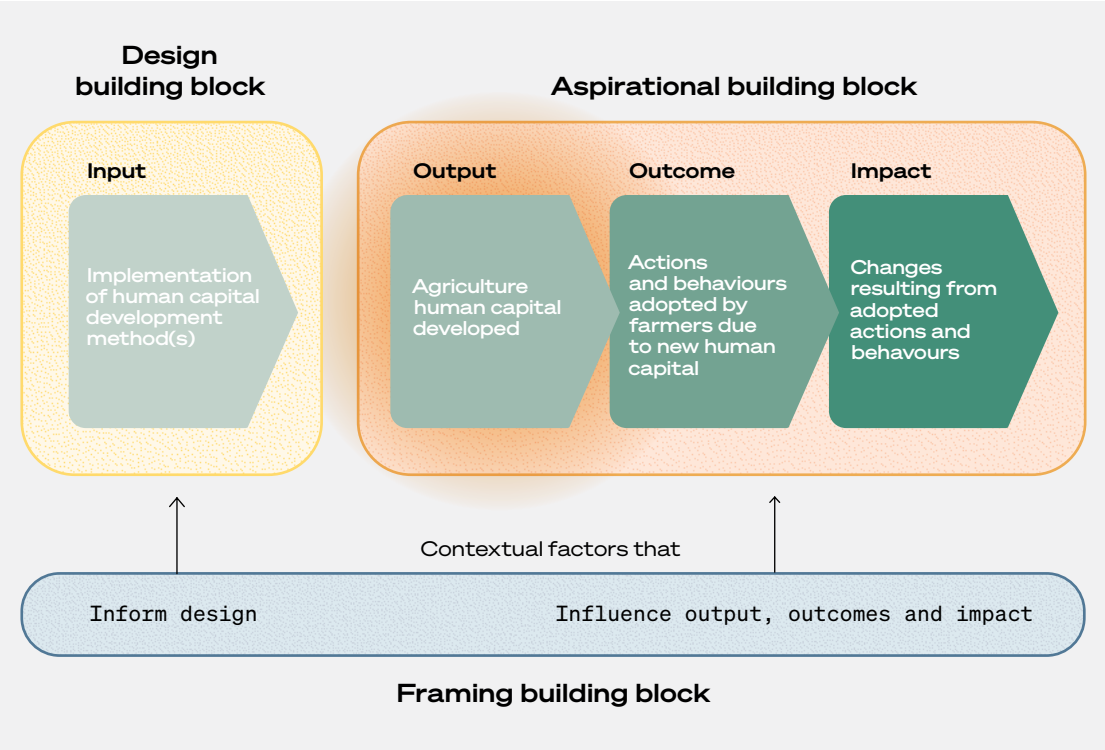


Figure 3.2
Three building blocks in augmenting agriculture human capital investments

SOURCE: Authors' own elaboration.

Key questions for the aspirational building block:

- What role does farmers' human capital play in bringing about desired impacts? Is it fundamental, such as empowerment, or supportive, such as better technical or decision-making skills?

Key question for the design building block:

- How can implementing human capital development methods develop this human capital?

Key question for the framing building block:

- How do contextual factors affect how human capital can be developed and how successfully it leads to outcomes and eventually impacts?

! While we divide the process of building an agriculture human capital investment into these three blocks, they are not three distinct phases to be undertaken in a prescriptive order. Rather, they represent information gathering, goal-setting and decision-making activities that are ongoing, and interdependent.

THREE BUILDING BLOCKS – OBJECTIVES AND KEY ACTIVITIES

We now discuss each of the three building blocks. Figure 3.3 presents them and the elements of each one as well as their main objectives and activities. In total there are 15 elements (A–O) across three building blocks. Each of these elements has its own objectives and activities and is described in the text. In each building block, farmers as well as partners play a pivotal role and there is a need for their active participation at each stage. See Module 5 for two cases exemplifying the three building blocks.

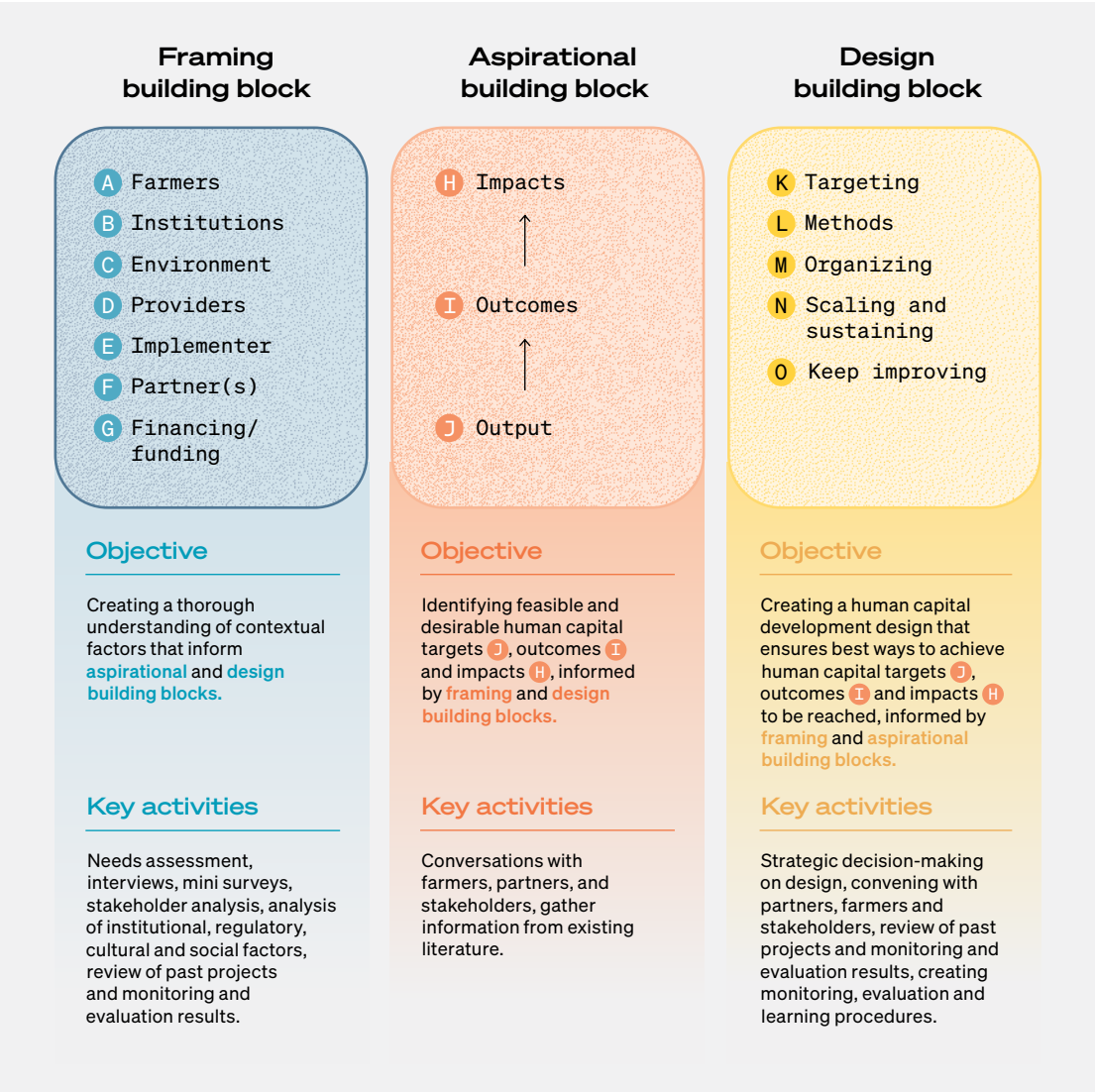


Figure 3.3
Content, objectives and key activities of three building blocks

SOURCE: Authors' own elaboration.

Framing building block
Objectives and key activities

Main objective

Creating a thorough understanding of contextual factors to inform aspirational and design building blocks.

As with the development of any project goal, developing human capital in agriculture is highly sensitive to its context, and is particularly dependent on the people who are set to learn new skills and acquire new capacities. Investing in AHC is only fruitful when learners find it relevant, appropriate, timely and useful. The framing building block is therefore very focused on the mindset of learners, or farmers, but also other factors presented in the following elements.

! The main elements of the framing building block are A–G in Figure 3.3. However, these, as well as key information about them, will vary from project to project and place to place, and the descriptions and topics highlighted below are not exclusive nor exhaustive. They may or may not overlap by their very nature.

A Farmers: socioeconomic and cultural conditions

DESCRIPTION

Farmers, pastoralists, fishers, foresters, and other small-scale producers (here referred to simply as farmers) make up the main target group for agriculture human capital investments under discussion. These learners stand to gain new capacities, learn new skills or gain new knowledge. Therefore, it is essential to understand what they consider an improvement to their livelihoods and what they need to attain it, as well as aspects of their way of life and socioeconomic conditions that may influence the learning process, such as customs, existing or traditional knowledge, culture, preferences, and desires.

KEY ACTIVITIES

Identify the geographical scope of the project and potential target group(s). Conduct needs assessments via semi-structured interviews, minisurveys, focus group discussions and participatory consultations with potential target group(s) and if relevant, other key informants with deep knowledge of the living and socio-economic conditions of the target group. Depending on the geographical scope of the project, be sure to consult with farmers representing different agro-ecological zones, Indigenous Peoples, gender and age groups and, production and livelihood systems (FAO, 2011).

The main areas we need to understand from conversations with farmers include:

1. What are the current agriculture / livelihood systems among the target group?
2. What are the main challenges or struggles that farmers face?
3. What are farmers' needs and aspirations to better their livelihoods?
4. What are the opportunities for changes in actions and behaviour to alleviate those struggles or fulfil those needs and aspirations? And which of these do farmers consider desirable, appropriate, timely and useful?
5. Which support services are available to farmers such as financial, informational and marketing?
6. Which skills and capabilities will be useful to farmers to adopt those actions and behaviours?
7. Which relevant skills and capabilities do farmers already have which they can further develop to facilitate learning new skills? This can include Indigenous Peoples' traditional knowledge and local farmers' ancestral knowledge.
8. Which new skills and capabilities will complement existing skills and capabilities?
9. Which challenges and opportunities for learning and developing human capital do farmers identify?
    - Socioeconomic conditions: Social status, disabilities, financial assets, opportunity costs, size and status of land (leasing or owning), relationships, levels of education and literacy.
    - Logistics: Where are farmers in relation to the place of learning? Is transport available, , easy and affordable? Is there access to learning materials including digital resources such as smartphones, internet access and radio, farmers' calendars? Do farmers have access to a suitable place for onsite learning, e.g. a demonstration plot?
    - Farmer segments: Recognize the differences among farmers regarding levels of interest and opportunities and barriers to engagement, as well as understanding the root causes of any potential disengagement.

EXAMPLES OF AGRICULTURE / LIVELIHOOD SYSTEMS

Livestock rearing, cash crop and tree cultivation, home gardens, agroforestry, orchards, aquaculture, apiculture, fishing, as well as off-farm enterprises. Often systems are holistic and many overlap for an individual farmer. Investments in AHC are often embedded in one or several such systems, focusing on skills and capabilities directly applicable to that system.

Element A is a process rather than a one-off checklist. It is important to collect this information consistently while setting a theory of change (aspirational building block) and designing project implementation (design building block), and likewise to ensure farmer participation in all three building blocks, not just the framing building block. This is to avoid setting top-down priorities or implementation that is unsuitable for farmers.

B Institutions: institutional, political, legal and organizational conditions

DESCRIPTION

Institutions are any official or unofficial policies, norms, or organizations that affect the project. Official institutions can include national, district and local government agencies, para-governmental entities, policies and legal frameworks, for-profit enterprises, NGOs, associations and established community organizations. Unofficial (or one could call them intangible) institutions include markets, norms, customs, networks, and more loosely structured organizing patterns and activities, such as trading habits and migration.

KEY ACTIVITIES

Collect information through interviews with farmers, relevant stakeholders such as local authorities, district commissioners, spokespeople, local/national organizations/NGOs and governmental agencies. Conduct analysis on the legal landscape in the given district/country. Carry out market and/or value chain analysis relevant to the project (certain crops, local/district/international chains). Collect secondary data via national policy documents and stakeholder mapping. Review past human capital development projects in the area and the lessons learned.

The main areas we need to understand regarding institutions include:

1. Are community organizations present in the target group(s) and if so, what are their motivations, aims, activities, membership and level of influence? If there are a lot, how do they differ from each other, and interact?
2. Are there any other types of organizations in the community, such as NGOs, companies, associations that could affect the project, and in what way?
3. Which types of district and/or national organizations such as NGOs, companies, associations, could affect the project, and in what way?
4. Which local government agencies or forms of community governance are present, such as traditional/local authorities, chiefs, elders, mayors, and if so, what are their motivations, aims, activities and level of influence?

5. Which sub-national and/or national governmental institutions could be involved with the project and in what way?
6. What is the legal framework or set of policies that affect the project?
7. Are there any risks of future changes in policies/legal framework that could affect the project?
8. What are the defining customs, norms, patterns, markets, value chains and other intra-community organizations in place that could affect the project?
9. What are the defining inter-community or national organizing patterns, value chains or migration patterns?

! Keep in mind that activities from A and B can overlap, since farmers themselves make up local communities and therefore play active roles in local institutions, with varying levels of involvement. This is to avoid setting top-down priorities or implementation that is unsuitable for farmers.

C Environment: physical and natural conditions

DESCRIPTION

Environment here refers to the physical and natural environment where the project takes place. This includes the climate, soil, water, precipitation and wind conditions in which farmers undertake agriculture, fishing, or pastoralism. This can imply risks from natural or human-made events such as flooding, droughts, earthquakes, sea water rise, pests, pollution, new large-scale development projects like dams or highways. Lastly, it also includes the infrastructure necessary for farming, as well as for extension and service providers, such as roads, public transport, storage facilities and mills.

KEY ACTIVITIES

Collect information on the physical and natural environment through observations and interviews with farmers, extension staff (if any) and local stakeholders. Collect quantitative information, if available, in the form of weather and climate statistics for the area.[1]

The main areas we need to understand regarding environment include:

1. Is the necessary infrastructure in place for planned project activities?

1 For a good example of data collection tools for challenging environments, see KoBoToolbox. 2022. [online]. www.kobototoolbox.org

2. What are agro-climatic conditions like?
   - Do conditions suit some crops over others?
   - How healthy is the soil?
   - Is precipitation reliable?
   - Are groundwater levels reliable and adequate for irrigation? Are pumps and power sources available?
   - What are year-round weather patterns like? Are there risks of droughts or flash flooding?
3. Do the surrounding areas pose other types of risks, such as sea water rise, pests, air/water/soil pollution?
4. Are there any large-scale infrastructure and/or development projects affecting farmers' land or access to resources? Are any such developments planned and if so, how might they potentially affect farmers and farming activities?

D Providers: existing human capital development conditions

DESCRIPTION

A provider is anyone who facilitates any human capital development programming among farmers in pre-project implementation. This could be public extension staff assigned to the area of the potential target group or private businesses in communities providing agro-advisory services. If no providers are present, disregard this section.

KEY ACTIVITIES

Collect information through interviews with existing providers and farmers.

The main areas we need to understand regarding providers include:

1. If providers are in the given area, what are their current functions/roles/tasks/activities with the target group? What are their methods and approaches to human capital development?
2. What are their current capacities?
3. What is their standing with the target group? Are they trusted/recognized, and what is the general satisfaction level among clients?
4. Within which fields and institutions do they facilitate human capital development: technical, functional or business?
5. What role could current providers and their services play in the project?
6. Are there any constraints that deter providers from fulfilling their mandate?
7. How could their capacities fit or be developed for the purposes of the project, for sustained institutional capacity?

E Implementer: intra-organizational and capacity conditions

DESCRIPTION

The implementer or co-implementers refer to the organization(s) or entity(-ies) who bear the main responsibility for project design and implementation. These two tasks may be divided between two or more implementers or delegated to other persons or organizations who implement activities on the ground. The entities who implement sub-components are referred to as partners. They are responsible for specific portions but not the entire project (see F).

KEY ACTIVITIES

Conduct assessments of existing capacities and areas of potential capacity development within the implementing institution(s). Identify skilled staff and/or departments best suited for project design and implementation.

The main areas we need to understand regarding the implementer include:

1. Which capacities are beneficial or necessary for the project implementer?
2. To what extent are those capacities present within the organization?
3. Which staff/departments are most able to complete the project tasks?
4. Which areas or capacities could be strengthened or developed?
5. Given the capacity assessment, which tasks are suitable for the implementer to do in-house and which are better through collaboration with or outsourced to partners? (See F for partner capacities.)
6. What is the nature of the AHCI project, i.e. is it a stand-alone project or a component in a larger programme, and what does that mean for collaboration as an implementer?
7. What are the general mandate, approach and organizational structure of the implementer, and how do they relate to the implementation process?

! While this toolkit focuses on individual capacities, it is important to note there are three levels: individual, organizational, and systems (or enabling environment) capacities. Most farmers are part of social systems and farmer groups or cooperatives, which also need organizational level capacity. Links between organizational capacities are shown in the case on professionalizing farmer organizations through private sector-led models (Gordon, 2021). Individuals and organizations can function better when there is system-level capacity, the ability to shape and implement policies and regulations for the benefit of agrifood actors.

F Partner(s): collaboration opportunities and conditions

DESCRIPTION

Partners can be any organization(s) or person(s) with whom the implementer is collaborating on project design and/or implementation and who contribute resources.
These can be actors functioning at national, district or local level, or all three.

KEY ACTIVITIES

Conduct analysis and/or strengths, weaknesses, opportunities and threats (SWOT) at local, district and national level for any stakeholders with capacities and insights relevant to the project. Hold initial talks and discussions with potential partner(s) to estimate organizational fit.

1. Which actors with capacities and insights relevant to the project are present?
2. Which capacities or other resources could they contribute in project design and/or implementation?
3. Is a partnership feasible or desirable? If so, what form of partnership should it be?
4. Could there be risks entering into a partnership? If so, what are they?
5. If partnership is feasible and desirable, how are tasks to be delegated and good communication ensured?

G Financing and/or funding: resource and financial conditions

DESCRIPTION

These comprise the resources available for project design, implementation, monitoring and evaluation for the lifespan of the project or programme.

KEY ACTIVITIES

Create a clear overview of budgeted resource flows. Conduct a risk assessment depending on the source of resources.

The main areas we need to understand regarding funding include:

1. Which resources are available for project implementation, and what does that mean for the general scope of the project?
2. Where are resources coming from?
3. What is the timing of resource flow(s) throughout the lifespan of the project?
4. Are there any risks to future flow of resources and its reliability depending on source(s)?
5. What are the capacities of implementer(s) and/or partner(s) to handle and report on funding? (These are part of the assessments in E and F)
6. What funding or resources exist to continue the project activities in a sustainable way at the same location and to upscale to other locations?

Aspiration building block
Objectives and key activities

Main objective

Select feasible and desirable human capital (J), outcomes (I) and impacts (H), informed by framing and design building blocks.

Setting a theory of change for a project and incorporating AHC can be challenging. We suggest doing so based on a thorough understanding of relevant contextual factors, which is based on information gathered in the framing building block (elements (A)–(G)).

KEY ACTIVITIES

Analyse accumulated information/data from framing building block activities ((A)–(G)). Source existing knowledge from impact assessments and evaluation of other projects or programmes. Identify feasible and desirable human capital, outcomes and impact in participation with farmers.

(H) Impacts: the long-term desired effects of the project

OBJECTIVE

Identify desired impacts of the project based on needs and aspirations of farmers. What is the long-term, measurable change that you want to see? Identify feasible and desirable human capital, outcomes and impact in participation with farmers.

Main questions to consider:

1. Based on conversations with farmers ((A)) on needs and aspirations, which are the main challenges within the given agricultural/livelihood systems that the project aims to address?
2. Which opportunities exist to overcome those challenges?
3. Which opportunities could farmers pursue by changing actions and behaviours?

Is each opportunity feasible, measurable, timely and appropriate, given information from the framing building block (elements (A)–(G))?

EXAMPLES OF IMPACTS

Increased incomes, increased resilience of agricultural/livelihood systems facing certain disruptions, increased empowerment of marginalised groups in agricultural/livelihood systems, improved health and nutrition.

I Outcomes: changes in actions and behaviours

OBJECTIVE

Identify changes in actions and behaviours (outcomes) that can lead to the desired impact.

The main questions to consider include:

1. Based on accumulated information from A–G, which changes in actions, activities and behaviours are most likely to lead to the desired impact?
2. Which of those changes can best be facilitated or are most likely to follow from developing new skills and capabilities among farmers?
3. Based on accumulated information from A–G, which actions and behaviours are measurable, feasible, timely and appropriate?

EXAMPLES OF OUTCOMES

These include adoption of technical agricultural practices, such as integrated pest management, pruning, harvesting, irrigation systems and storage, changes in behaviour such as taking up new leadership or entrepreneurship roles, changes in division of labour between household members, changes in strategies to reach markets or secure fair prices.

J Outputs: agriculture human capital

OBJECTIVE

Identify agriculture human capital that can lead to desired outcomes.

The main questions we need to consider include:

1. Based on accumulated information from A–G, which type of AHC is most likely to lead to the desired outcomes?
   - Which **type** of AHC: knowledge, skills, education, empowerment, networking and/or social capital?
   - Which **field** or combination of fields of AHC: technical agriculture, functional and/or business skills?
2. Based on accumulated information from A–G, is the development of those new skills and capabilities feasible, measurable, timely and appropriate?

EXAMPLES OF OUTPUTS

Skills, knowledge, capabilities, greater self-esteem, positive attitude, confidence within fields of agricultural techniques and practices, social interactions and business practices as well as other areas relevant to the given agriculture/livelihood system or general well-being. It can also include changed mindsets, attitudes, and judgements.

! Make sure to set the goals of H, I and J in consultation with targeted farmers. See Figure 3.4 for an example.

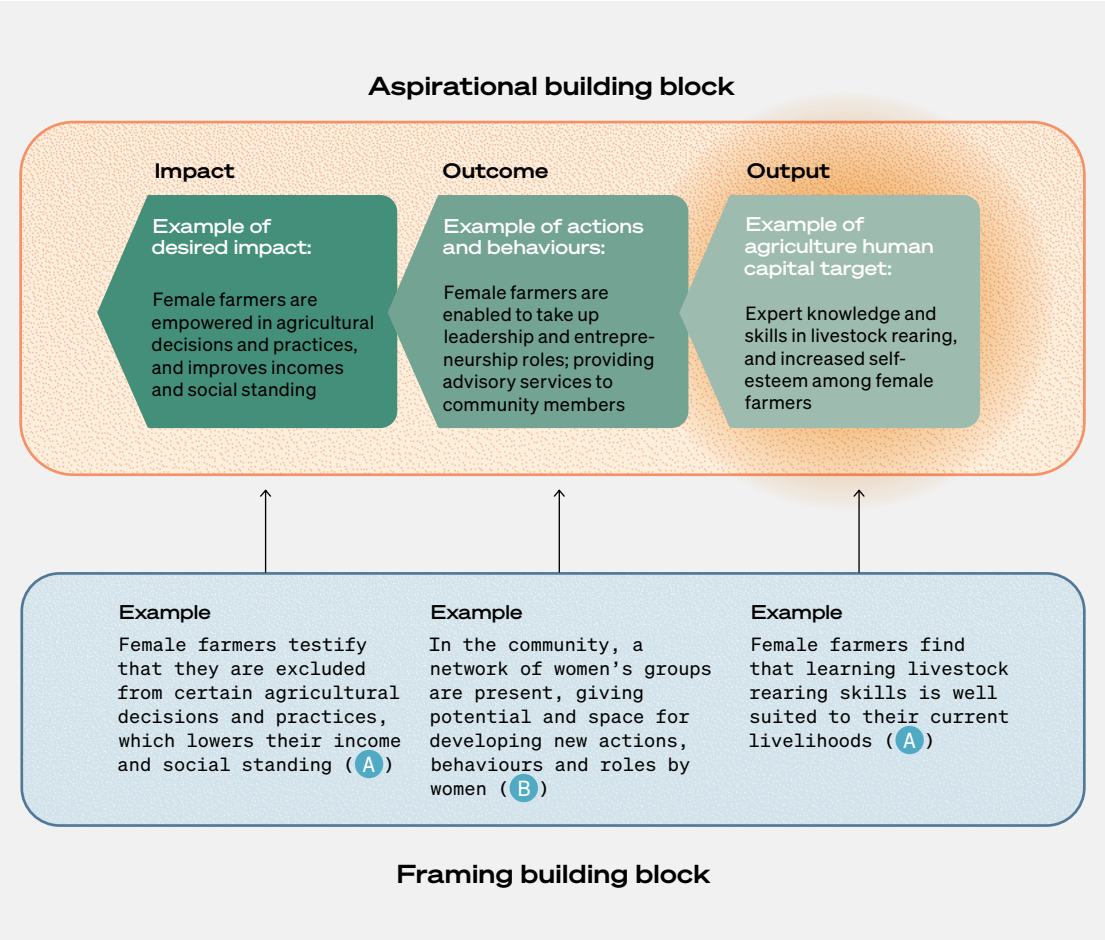


Figure 3.4
Example of aspirational building block informed by framing building block

SOURCE: Authors' own elaboration.

Design building block
Objectives and key actions

Main objective

Create a project design that ensures the likelihood of reaching human capital targets J, outcomes I and impact H, informed by framing and aspirational building blocks.

! The following elements within the design building block are meant as a tool to incorporate thinking and considerations on AHC within the project design, and not as a new set of project design guidelines, many of which exist.[2]

K Targeting

OBJECTIVE

Through a participatory process, select target group(s) that: a) are interested in partaking in the project; b) have potential to acquire new human capital and benefit from it; and c) testify to various needs and aspirations aligned with the project.

KEY ACTIVITIES

1. Within the geographical scope set in A, develop clear criteria for selecting the geographical areas of the project. This will depend on:
   - logistical scope and resource availability of the project (revert back to G);
   - government priorities (B);
   - location-specific challenges the project aims to address (H), e.g. poverty, unemployment, food safety, climate change adaption, market access;
   - location-specific know-how and heritage of knowledge in relation to agrifood systems;
   - location-specific opportunities the project aims to take

2 For useful project design guidance, see FAO Investment Learning Platform: www.fao.org/investment-learning-platform/investment-cycle-phases/en/; World Bank Project Cycle: https://projects.worldbank.org/en/projects-operations/products-and-ser-vic-es/brief/projectcycle#:~:text=Once%20all%20project%20details%20are%20negotiated%20and%20accepted,and%20the%20legal%20documents%20are%20accepted%20and%20; IFAD Project design and Management: www.ifad.org/en/project-design-and-management

advantage of: agroclimatic conditions allowing for different agricultural/livelihood systems (C); for example: suitable conditions for grazing, tree cover, growing certain crops, or developing aquaculture; existing capacities of local organizations (B);
    - other ongoing projects or programmes in the area;
    - possibilities for collaboration with partners in the area.

2. Based on new consultations with farmers on geographical scope through, for instance, participatory needs assessments, minisurveys, focus group discussions or other formats, discover:
    - Which farmers have the potential or are already involved in agricultural/livelihood systems connected with the project?
    - Which farmers have expressed interest in acquiring new human capital related to a given agricultural/livelihood system?
    - Which farmers are willing to invest time, effort and potentially resources in learning new skills and acquiring new capabilities?
    - Which farmers express needs and aspirations aligned with the project?

3. Drawing on these consultations as well as assessments conducted as part of A, B and C, select the target group(s) of the project whose human capital you want to further develop.

4. Create an inclusion strategy ensuring all target group segments can participate.
    - Identify the barriers to participation or engagement each segment or target group faces, e.g. lack of transport or other resources (financial, digital tools, land), lack of social acceptance in relation to gender or LGTBQIA+ norms, social standing or lack of physical abilities. This can also include understanding why some farmers are not interested in participating.
    - Devise a strategy to ensure participation for each target group segment given their socioeconomic barriers and available resources.
    - Use this strategy when selecting development methods and designing the implementation activities in L.

! Be sure to provide reliable and attainable incentives for learning rooted in the needs and aspirations of farmers (data from A). If incentives such as higher value or productivity of crops, greater well-being remain out of reach despite acquiring skills and capacities, farmers may see no reason to invest time and effort in learning (Davis *et al.*, 2021; McNamara, 2020).

L Method: how to develop agriculture human capital

OBJECTIVE AND KEY ACTIVITIES

Select **agriculture human capital development method(s)** and design implementation activities best suited for AHC development.

Module 5 is dedicated to decision-making around selecting and designing the best method to develop human capital in agriculture based on conditions and goals.

EXAMPLES OF DEVELOPMENT METHODS

Farmer field schools (FAO, 2016), certified community promoters, farmer training centres.

M Organizing: how to organize and manage implementation

OBJECTIVE

Design an organizational and management structure to implement human capital development that outlines the division of tasks, responsibilities and decision-making processes.

KEY ACTIVITIES

1. Who does what, and how should they do it? Based on assessments from A, B, D, E, F, in consultation with respective actors the roles, outline responsibilities and decision-making processes for the actors that have significance for the development of human capital:
   - farmers (A);
   - other stakeholders involved (B);
   - providers of human capital on the ground (D);
   - implementer or co-implementers (E);
   - partner(s) (F).
2. Define the ways in which these roles relate to:
   - How you plan to form governance bodies for decision-making, oversight, budgeting and financial decisions (e.g. a steering committee). Consider the degree of decentralisation in decision-making, such as the design or financial decisions farmers themselves should make to support ownership of learning processes.
   - Develop human capital directly. Which tasks relate to each activity in implementing agriculture human capital development methods L? Consider existing local institutional systems/customs/responsibilities and define roles that complement them. Local farmer groups and community members could well take on certain tasks.
   - Set up new institutions to work within the organizational structure such as community-level commissions, boards or councils with defined roles and responsibilities.

3. Monitoring, evaluation and learning tasks (O) Establish capacity strengthening within identified areas or institutions of need (revert back to identified institutional skills needed under E).
4. Establish communication and reporting channels and procedures throughout implementation.

! AHCIs are often components of a larger programme investing in other areas simultaneously. Having a clear outline of intra-organizational roles and responsibilities as the implementer is key to facilitate development of human capital.

N Scaling and sustaining

OBJECTIVE

Create a strategy that maintains the desired continuity and allows for replication and scaling of human capital development prior to implementation.

KEY ACTIVITIES

1. Assess which aspect(s) to sustain in the long run plus required scaling, actions and strategies.
   - **For the project itself developing human capital**, consider what it requires to ensure continuity, or its different components, beyond the initial time limit. Will the funding continue or are there alternative sources, partnerships, implementer(s), and capacity building from relevant institutions? Also, what would it require to scale up the project, and is there funding available for that?
   - **Are there any successful approaches** from the project implementation? Discuss with relevant stakeholders how to continue, scale up or integrate these approaches into other programmes or into new ones. Provide ample evidence and documentation with information.
   - **Is there developed human capital** among farmers and is it possible to ensure continuous farmer support? Will farmer coaching and advisory services or other supports be available after the project ends? Can they be scaled up beyond the project?
   - **What are the outcomes and impacts of the project?** This may need a more holistic approach to identify a wider set of factors that support certain actions, behaviours and wider impacts. Consider how to sustain certain relationships, market channels, networks and other factors post project and how to scale up.

2. Take step one in consultation and collaboration with partners and other stakeholders, potentially reaching out to new stakeholders, governments, ministries and companies that are relevant in terms of continuity, replication or scaling up.

O Keep improving

OBJECTIVE

Create a clear strategy for monitoring, evaluating and learning to keep improving the project design once implementation starts.

KEY ACTIVITIES

1. **Pre-implementation:** Establish monitoring, evaluation and learning mechanisms.
   - Collect baseline data on existing skills and capabilities through surveys, interviews and focus group discussions prior to implementation.
   - Set up channels for grievance, feedback and information sharing that are easily accessible for farmers, providers and staff working on the project, to learn from success or barriers to human capital development.
   - Establish clear procedures on handling complaints, grievances and other feedback that are integrated into the organization (M) of the project.
   - Ensure transparency of practices for all of the above to promote awareness among all involved, including communication channels.

During implementation: Collect results on progress towards set human capital indicators through surveys, interviews, focus group discussions and compare with baseline data as well as human capital targets (J). Consider mid-term reviews.

2. **During implementation:** Collect data from feedback and grievances and follow established procedures. Ensure that feedback is used to improve project performance.

3. **Consider methods** such as log frames, randomized control trials, participation, reflection workshops, minisurveys, interviews.

INDICATORS FOR AGRICULTURE HUMAN CAPITAL

There is no one way to determine indicators for AHCI when collecting baseline data and subsequently monitoring and evaluating progress. One could choose indicators of output, that is: What human capital have farmers gained? This can be difficult to measure but could rely on qualitative data from farmers, through surveys, interviews, focus group discussions. Progress indicators on outcomes, that is: To what extent are farmers adopting new actions and behaviours? Likewise rely on qualitative data from farmers but could be supplemented with observational

data. Finally, assess indicators on impact, that is: To what extent has the project delivered the desired goal(s)? This depends on the nature of the goal(s). If the project aimed for quantifiable goals such as increases in productivity or incomes, there are ways to measure impact through quantitative data, although there are significant challenges in determining cause and effect. If the project aimed for goals that are difficult to quantify such as well-being and empowerment, monitoring and evaluation is again based on qualitative data collection. For a deeper understanding of impact evaluation of AHC investments, see Module 4 and other useful resources (FAO, 2022a; FAO, 2022b).

! Often, strategies for N and O are not fully formed until the project is ongoing. We suggest rather that all elements of the design building block are thoroughly planned fully prior to implementation. This includes developing an exit strategy as one of the first steps of the design process.

BOX 3.1

ENVIRONMENTAL AND SOCIAL SAFEGUARD CONSIDERATIONS FOR AGRICULTURE HUMAN CAPITAL PROJECTS

All AHCI projects occur within a bigger picture: building human capital (output) such that behaviours and actions are changed (outcome) and lead to larger project/programme goals (impact) within a given area (geographical and societal). It can be difficult to imagine that an AHC project could have negative environmental and/or social impacts, however this can happen if the context within which the project works is not adequately assessed beforehand. Negative social impacts could be in the form of social conflict between those who receive the training and those who do not or discord over cultural sensitivity of the human capital targeted (e.g. does the project conflict with existing cultural norms or traditional knowledge?). The building of human capital can also, if not accompanied by specific safeguards or incentives to reduce these risks, prompt "brain drain", where newly trained participants acquire skills that encourage them to leave their area because of the absence of local opportunities or compensation.

By assessing the social context within which the project is planned, project designers can avoid, reduce, or mitigate these potential risks and negative impacts. It is important to consider inclusiveness when targeting participants, as some who are already well off, in terms of literacy or access to information, might be overrepresented compared to those more in need. In some cases, it is likewise essential to create a "safe space" for capacity development for the individual, as it is sometimes discouraged by religious beliefs, tradition, gender roles, norms and policies. A coaching approach to personal learning could remove any potential harm in these situations. With regards to wider conflicts, FAO provides guidance on conflict sensitive programming that can prove useful (FAO, 2020).

Likewise, on the environmental side, the human capital intervention (and the larger outcome or impact to which it contributes must be assessed in relation to environmental sustainability. An example of a well-intentioned human capital idea gone awry is the case of training farmers in some countries with water shortages and poor connectivity to irrigation systems in the use of solar irrigation pumps. In theory, the idea seems wonderful: farmers have access to water, agricultural productivity increases, they acquire skills in on-farm water management using renewable energy. In reality, the result is far from ideal. In countries without groundwater monitoring or legislation and enforcement on its use, many of these solar powered irrigation pumps are depleting groundwater resources without any replenishment and have developed into a problem of their own. The lesson learned is that without assessing the related output, outcome and impact of a project against the wider environmental, legal, social and political context a good idea can turn out to be disastrous

SOURCE: Authors' own elaboration; FAO. 2020. The programme clinic designing conflict-sensitive interventions: approaches to working in fragile and conflict-affected contexts. Rome, FAO. www.fao.org/3/ca7494en/ca7494en.pdf

INFORMATION FLOW BETWEEN BUILDING BLOCKS: A KEY PRINCIPLE OF DESIGN AND "O KEEP IMPROVING"

As is evident above, the flow of information between the three building blocks is key. This is the case in the pre-implementation or design phase (Figure 3.5) as well as during implementation (see Figure 3.6). In the latter, the aspirational building block becomes an evidence building block, where data on actual outputs, outcomes and impact move from being aspirations to guidance for continuous improvement in the design building block, and is therefore the primary principle of O Keep improving.

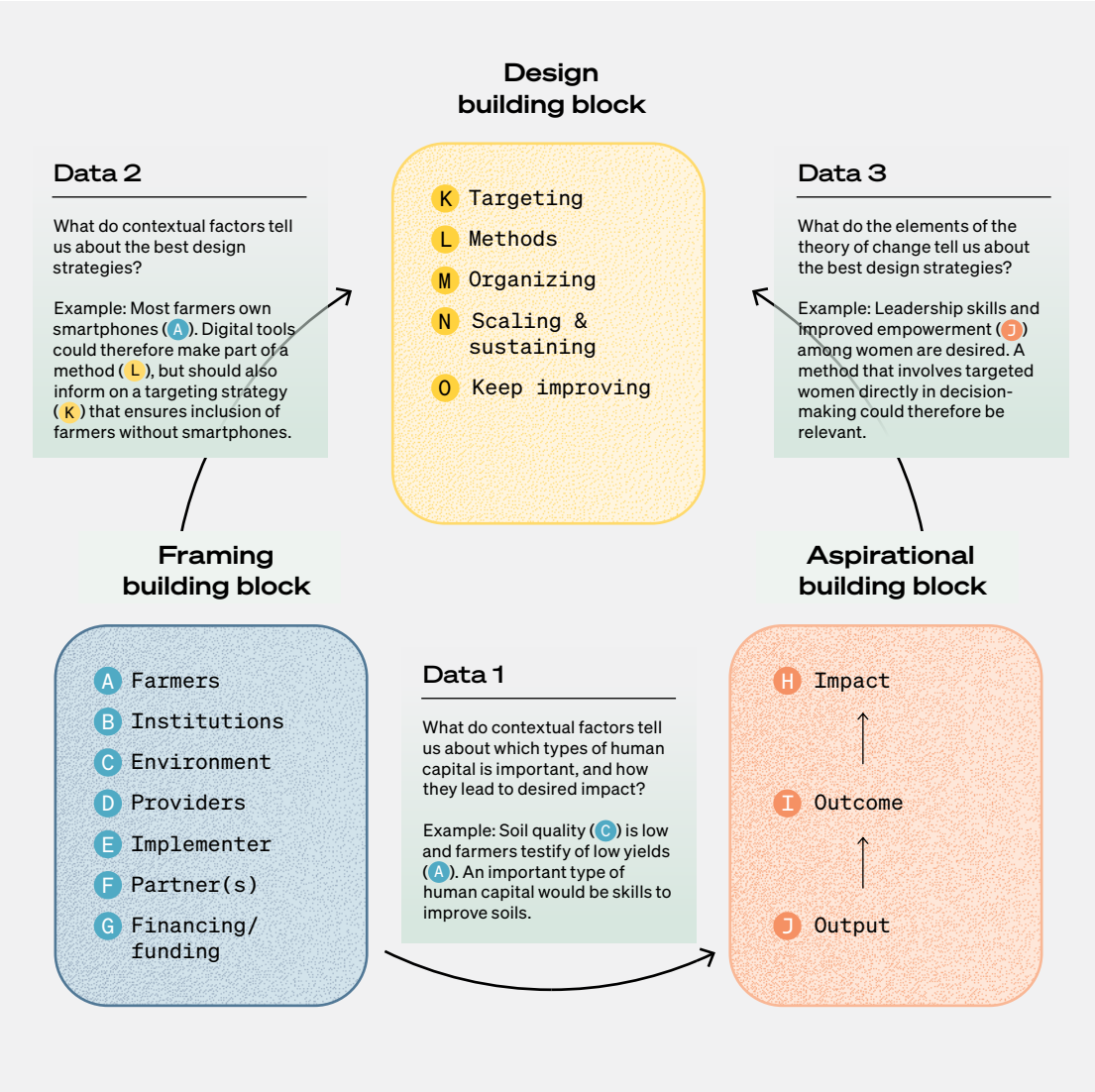


Figure 3.5
Information flows between building blocks pre-implementation

SOURCE: Authors' own elaboration.

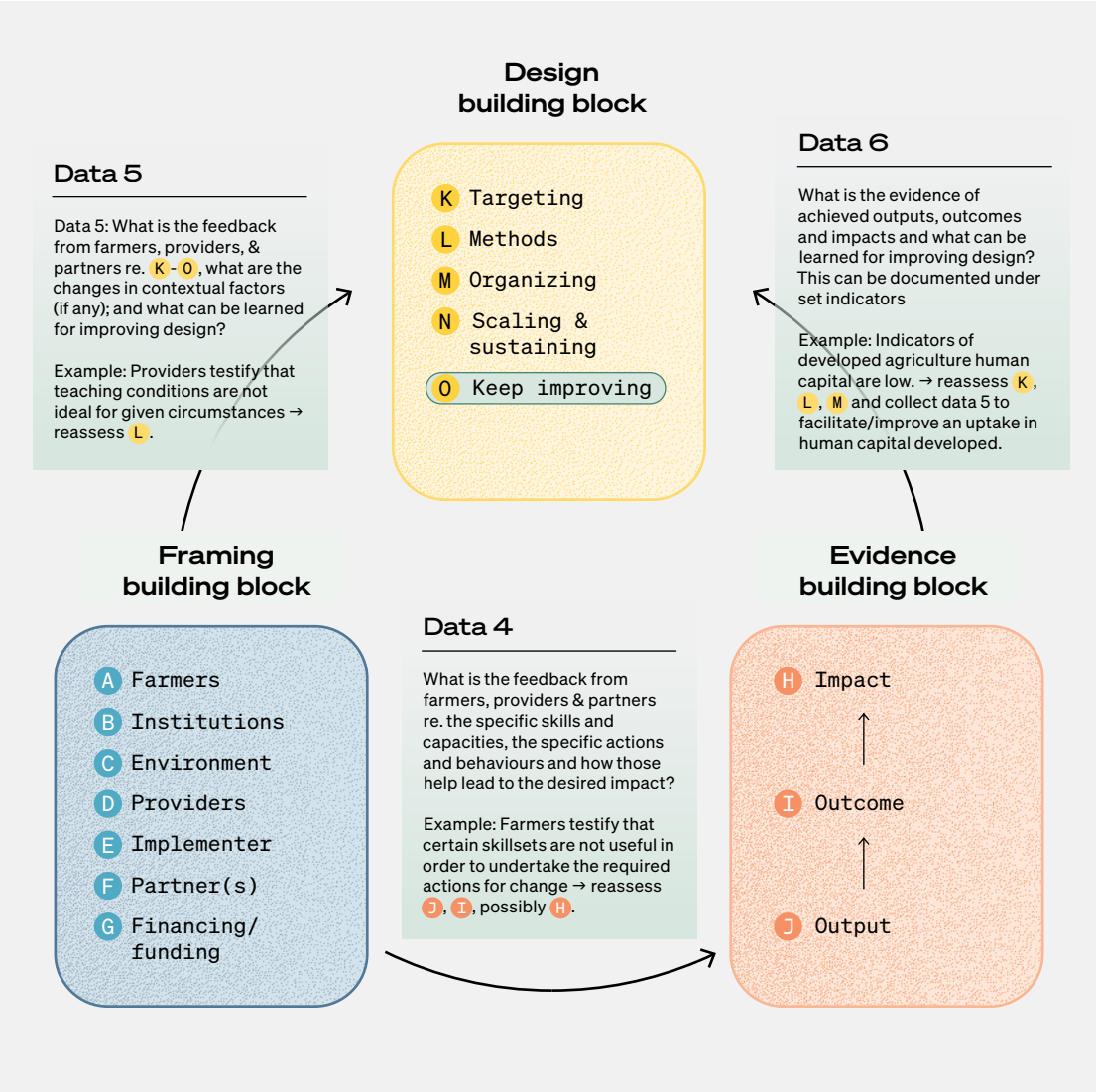


Figure 3.6
Information flows between building blocks implementation

SOURCE: Authors' own elaboration.

©FAO/Luis Tato

©CIFOR/Faizal Abdul Aziz

Module 4
Agriculture human capital investment development methods

Learning objective

To be able to list different types of methods to develop human capital. You can then select appropriate human capital development methods based on your context, resources and goals.

INTRODUCTION

Having discussed what AHC is, theories of change using human capital, and the different components of project design, we now turn to AHC development methods. We omit the word "agriculture" in this module on the basis the term "human capital" refers to human capital in agriculture. This module lists human capital development methods, presents indicators and criteria for assessing them and describes selected methods. Next, the module presents tables to help select which methods to use and discusses principles for deciding how to combine methods.

LIST OF AGRICULTURE HUMAN CAPITAL DEVELOPMENT METHODS

Many human capacity development methods have developed for different purposes, target groups and conditions. As shown in Figure 2.2 in Module 2, human capital development methods may be categorized as:

- formal, involving the agricultural education system;
- non-formal, including extension and advisory services and training for specific purposes and skills; and
- informal, where learning is more ad hoc as when farmers learn from each other or other informal sources such as input supply shops.

Human capital development methods may also be categorized according to their target, that is, individuals (e.g. call centres), groups (e.g. farmer field schools) or the public at large (e.g. radio).

The list below is not exhaustive but includes most of the methods that have been documented, such as JICA (2008), Hoffman *et al.* (2009), David and Cofini (2017) and Davis *et al.* (2018). Methods are listed by type (formal, non-formal and informal) and then within each type, depending on whether the method targets individuals, groups, or the public at large. The 16 starred methods are described in more detail in the next section followed by discussion of the criteria.

FORMAL

GROUP

- Agricultural universities
- Agricultural vocational schools*
- Certification programmes from government, educational institutions, private sector (e.g. community promoters)*
- Farmer training centres*

NON-FORMAL

Extension and advisory methods

INDIVIDUAL

- Benchmarking for farm business analysis
- Agricultural call centres*
- Extension agent advising individual farmers
- Management advice for family farms*
- Plant health clinics
- Village agents*

GROUP

- Demonstrations
- Enablers of rural innovation
- Extension agent advising groups
- Farmer field schools*
- Farmer study circles
- Farmer-to-farmer extension (e.g. lead farmers, community promoters)*
- Household methodologies
- Innovation platforms
- Learning events/workshops
- Service provision by cooperatives
- Study tours*
- Videos*

PUBLIC AT LARGE

- Edutainment television*
- Extension campaigns
- Fairs and shows*
- Mobile phone extension with basic features for text messages and interactive voice response
- Radio*
- Smartphones/computers/laptops with internet for:
    - Digital portals, knowledge banks and platforms
    - e-learning platforms
    - Mobile apps
    - WhatsApp, Telegram and other social media discussion groups*
    - Tele/video conference

INDIVIDUAL

On the job training

- Internships/apprenticeships*
- Coaching/mentoring*

INFORMAL

- Coaching/mentoring
- Experience
- Farmers advising each other in absence of a programme
- Markets/input suppliers

PUBLIC AT LARGE

- Meetings

* Described in more detail in the next section

Human capital development methods may also be categorized according to their target, that is, individuals (e.g. call centres), groups (e.g. farmer field schools) or the public at large (e.g. radio).

The list below is not exhaustive but includes most of the methods that have been documented, such as JICA (2008), Hoffman *et al.* (2009), David and Cofini (2017) and Davis *et al.* (2018). Methods are listed by type (formal, non-formal and informal) and then within each type, depending on whether the method targets individuals, groups, or the public at large. The 16 starred methods are described in more detail in the next section followed by discussion of the criteria.

BOX 4.1

EXTENSION AND ADVISORY SERVICES AND HUMAN CAPITAL DEVELOPMENT METHODS

Extension and advisory services (EAS) are the activities from different sectors that facilitate farmers' access to knowledge, information and technologies; their interaction with markets, research and education, and the development of technical, organizational and management skills and practices" (Davis and Sulaiman, 2018). EAS account for most of the human capital development methods available to farmers in the South. Other methods include educational institutions, on-the-job training such as internships and apprenticeships and informal methods such as farmers' interactions with each other.

SOURCE: Authors and Davis, K. and Sulaiman, R. 2018. Overview of extension philosophies and methods. In: Davis, K., Bohn, A., Franzel, S., Blum, M., Rieckmann, U., Raj, S., Hussein, K. & Ernst, N. eds. 2018. What works in rural advisory services? Global Good Practice Notes. Lausanne, Switzerland: GFRAS, pp. 3-6.

FIELDS AND TYPES OF HUMAN CAPITAL DEVELOPED, CHANGES IN HUMAN CAPITAL SOUGHT AND CRITERIA FOR ASSESSMENT

The descriptions of the methods include fields and types of human capital developed, changes in human capital sought and criteria and indicators used for assessing the methods. These three sets of descriptors are defined below.

Fields of human capital developed

Here we look at fields of human capital as defined in Module 2 that the method can develop easily.

Changes in types of human capital sought that may increase or improve these types, as defined in Box 1.2.

Criteria for assessing human capital development methods

Five of the seven criteria are adapted from David and Cofini (2017) and compare methods in tables presented in the section "Principles for selecting which methods to use" (pp 80–84).

1	**REACH**	The number of people who can participate in or use a particular method. This could be the number of persons trained or the numbers listening to a radio broadcast. Categories used for this toolkit include wide, moderate and limited.
2	**EASE OF IMPLEMENTATION**	This assesses the level of difficulty in applying a method, including content development, recruiting and training. The categories are easy, moderate or difficult.
3	**COST**	The cost of implementing a method includes staff salaries, transport and equipment. The categories are low, medium and high.
4	**COST PER USER**	Cost per user or per trainee is the total cost divided by the number of persons participating in or using the method. Note that the cost of a method such as a television show may be high while the cost per viewer may be low. The categories are low, medium and high.
5	**SUITABILITY FOR LOW LITERACY POPULATIONS**	This assesses the level of difficulty in applying a method, including content development, recruiting and training. The categories are easy, moderate or difficult.
6	**SUITABILITY FOR WORKING WITH WOMEN AND YOUTH**	This is the extent to which the method can accommodate constraints faced by women (such as lack of time due to domestic work, childcare needs, cultural taboos on mixing with men) or by youth (such as constraints on speaking when elders are present). The categories are high, medium and low.
7	**FINANCIAL SUSTAINABILITY**	This assesses feasibility for national and local institutions to continue financing the method once external support ends. The categories are high (highly feasible), medium and low.

Other criteria could be included in the above list, such as scalability, ease of accessing a method, and suitability for working with other target groups, such as disabled or Indigenous Peoples. Some such as ease of access are highly nuanced and depend on the context, such as the target population's education level and the proportion with access to smartphones or the internet. Others, such as suitability for Indigenous Peoples, may be relevant only in some instances. Planners can include additional criteria as needed.

DESCRIPTION OF SELECTED HUMAN CAPITAL DEVELOPMENT METHODS

The selected human capital development methods are described below in alphabetical order within the three main development categories (formal, non-formal, and informal). The descriptions of methods draw upon Davis *et al.* (2018), David and Cofini (2017) and other references, specific to each method.

Agricultural call centres

DEFINITION

An information hub that people call to receive timely and relevant information and advice. Call centres also help link farmers to services such as input suppliers, produce marketers or credit providers.

PRINCIPLES

The information and advice provided by a call centre need to be accurate, up-to-date, accessible, relevant and timely. Farmers need to trust their call centre. This trust can be more easily developed if farmers already trust the institution connected to the call centre. For example, i-*shamba* (farm), a farmer information service in Kenya is associated with the popular agricultural television show *Shamba* Shape Up (see method on edutainment television) and operates an agricultural call centre that farmers can subscribe to free of charge.

IMPLEMENTATION

To understand farmers' needs, preferences and capabilities requires a comprehensive needs assessment. Key operational decisions include:

- which languages to use;
- whether to answer calls directly or use interactive voice response (automated replies with the caller selecting different options);
- which hardware and software to use;
- how to develop the call centre application, that is, the repository of knowledge that call agents access to reply to callers' questions;
- whether calls can be linked to locations via global positioning systems (GPS) so that information given is adapted to the caller's precise location;
- which data to capture from the call and how to use the data to manage knowledge and improve performance.

Particular attention needs to be given to recruiting and training call agents as the direct point of contact for callers.

FIELDS OF HUMAN CAPITAL DEVELOPED	Technical agriculture
CHANGES IN HUMAN CAPITAL SOUGHT	Increased knowledge, networks
REACH	Moderate, often limited to paid subscribers or members of particular organizations.
EASE OF IMPLEMENTATION	Difficult, requires considerable expertise in agriculture, call handling procedures, customer relations and call centre hardware and software.
CAPACITIES REQUIRED AND COST	Required expertise includes call centre management, technical agriculture, operations and call centre agents with agricultural background and good communication skills. Costs are high but cost per beneficiary may be low to moderate if the number of users is high.
SUITABILITY FOR WORKING WITH LOW LITERACY POPULATIONS	High, as long as they have access to phones.
SUITABILITY FOR WORKING WITH WOMEN AND YOUTH	Moderate to high, services may attract more youth and women if they are represented among the call agents.
FINANCIAL SUSTAINABILITY	Moderate. Key aspects are building trust among users and assuring them they can get relevant, accurate and timely information at low cost. Cost recovery is a challenge and may involve subsidies or direct payments from users.
STRENGTHS AND CHALLENGES	Strengths include two-way communication, location specificity (particularly when calls are GPS-located), and the ability to answer farmers' specific questions. Challenges include gaining the trust of the audience and managing the complex set of agricultural information, customer relations and call centre hardware and software.

Agricultural fairs and shows

SYNONYMS/ SUB-CATEGORIES	Trade fairs, trade shows
DEFINITION	Agricultural fairs and shows are public events with displays and exhibits to provide farmers with information on technologies and practices.
PRINCIPLES	Fairs may be organized by government agencies, NGOs, farmer organizations or private companies. They may deal with farming in general or focus on a particular sector such as livestock or seeds. They may be national in scale or focus on a particular region or district. Input suppliers and other service and equipment providers seek to increase their sales by showcasing their products and services for farmers and other stakeholders.
IMPLEMENTATION	Some common features of many fairs include: displays where participants view produce, livestock and technologies; exhibition areas where input suppliers and service providers showcase their products and services; forums where exhibitors make presentations to participants; training sessions where farmers can learn new skills and techniques; and business-to-business forums where farmer organizations and other businesses can meet, strengthen networks and conduct business. Many shows award prizes and feature music and other forms of entertainment. Some NGOs organize fairs with a particular objective in mind, as when Catholic Relief Services manages seed and voucher fairs across 11 African and Asian countries to help poor farmers access seed and promote local seed businesses (CRS, 2017).
FIELDS OF HUMAN CAPITAL DEVELOPED	Technical agriculture, business
CHANGES IN HUMAN CAPITAL SOUGHT	Increased knowledge, networks
REACH	Moderate
EASE OF IMPLEMENTATION	Difficult, requires a great deal of planning and administration

CAPACITIES REQUIRED AND COST	Costs of putting on a fair are high but costs per attendee may be low to moderate, depending on the numbers attending. Costs of attending may be high if great distances are involved. Considerable skills in planning, administration and logistics are required. Costs include renting venue and facilities, publicity, marketing, engaging exhibitors, organizing contests, and transporting farmers.
SUITABILITY FOR WORKING WITH LOW LITERACY POPULATIONS	High
SUITABILITY FOR WORKING WITH WOMEN AND YOUTH	Low to moderate for women as they may face difficulties travelling away from home and responsibilities such as childcare and domestic work, with gender taboos against travelling. High suitability for youth.
FINANCIAL SUSTAINABILITY	Low to medium, depending on the willingness of local governments or trade associations to take responsibility for organizing shows. Some costs can be recovered through company subscriptions and charging exhibitors.
STRENGTHS AND CHALLENGES	The strengths are that farmers can learn about a wide range of products and services in a short period of time in one location and companies can market their products and services to many farmers and businesses and obtain feedback on them. Farmers can build networks with other farmers, input suppliers and service providers. Challenges include high costs, complexity of planning and logistics, and difficulty in assessing their impact.

Agricultural vocational schools

SYNONYMS/ SUB-CATEGORIES	Agricultural colleges
DEFINITION	Agricultural vocational schools offer students two- to three-year study programmes, often in two tiers, one beginning after completion of primary school and the other after high school. Training objectives are either to prepare for employment in the public or private sectors or to improve the farming skills of persons expecting to work in or manage a farm after graduation.
PRINCIPLES	Vocational schools design programmes based on careful assessment of the training needs of the labour market, including both the public and private sector and policies ensure that women have access. In Cameroon, Agropastoral Training Institutes aim for at least 40 percent of their students to be women (Takamgang and Lhoste, 2021).
IMPLEMENTATION	Curricula provide more practical than theoretical training; a 70:30 ratio is considered a benchmark. Strong linkages with the private sector are important; these include its participation in training and supporting internships. Strong linkages with agricultural universities are important, particularly for research.
FIELDS OF HUMAN CAPITAL DEVELOPED	Technical agriculture, functional, business
CHANGES IN HUMAN CAPITAL SOUGHT	Increased knowledge, skills, education, networks, social capital
REACH	Limited to moderate
EASE OF IMPLEMENTATION	Difficult, especially given the lack of resources devoted by many governments to agricultural vocational training.
CAPACITIES REQUIRED AND COST	MSc and BSc level trainers and administrators are required. Costs include land, infrastructure, staff salaries, training and operations. Total costs and costs per trainee are high. In Cameroon, agropastoral schools charge students USD 358–448 per year for their two-year course while the total cost of training, including charges and costs the school covers, is USD 5770 per year (Takamgang and Lhoste, 2021).

SUITABILITY FOR WORKING WITH LOW LITERACY POPULATIONS	Low. Some recognise the low quality of primary education and offer foundational training in literacy and numeracy.
SUITABILITY FOR WORKING WITH WOMEN AND YOUTH	High for youth as nearly all vocational schools target youth. Moderate for women, many make special efforts to recruit women.
FINANCIAL SUSTAINABILITY	Strengths include low costs relative to universities and flexibility in programming and provision of relevant skills, to respond to labour market demand. Many also have strong internship programmes benefitting both students and their hosts. Challenges are that graduates lack the means to start businesses and schools often lack linkages to policymakers, the private sector and other educational institutions. Another problem is that the schools are sometimes viewed as second class or inferior, compared to universities.
STRENGTHS AND CHALLENGES	Strengths include low costs relative to universities and flexibility in programming and provision of relevant skills, to respond to labour market demand. Many also have strong internship programmes benefitting both students and their hosts. Challenges are that graduates lack the means to start businesses and schools often lack linkages to policymakers, the private sector and other educational institutions. Another problem is that the schools are sometimes viewed as second class or inferior, compared to universities.

Certified community promoters

SYNONYMS/ SUB-CATEGORIES	Certified farmer trainers
DEFINITION	These are farmer trainers or community promoters (see farmer-to-farmer extension) who are accredited and have successfully completed a professional programme that meets the prescribed standard for an occupation.
PRINCIPLES	Certification is the process whereby a professional society or other private or governmental body attests to the professional qualification of an individual. Certification provides a credible, third party assessment of a person's skills and knowledge. Individuals earn certification in an occupation by meeting the minimum standards of education or experience.
IMPLEMENTATION	In some places, such as Jharkhand State, India, certified master trainers and community promoters work in animal health, whereas in Ghana and Indonesia, certified cocoa doctors advise farmers on improved cocoa management practices. In India, the trainers and promoters earn income selling products to farmers (such as medicine) whereas in other cases, such as cocoa doctors, they are volunteers. Private companies like Mars Inc. operate certification programmes, cocoa doctors, whereas the certification of animal health workers in Jharkhand is managed by the Agriculture Skills Council of India, a governmental body (Amanah *et al.*, 2021; Kumar *et al.*, 2021).
FIELDS OF HUMAN CAPITAL DEVELOPED	Technical agriculture, business
CHANGES IN HUMAN CAPITAL SOUGHT	Increased knowledge, skills
REACH	Moderate
EASE OF IMPLEMENTATION	Moderate to difficult. Certification programmes managed by professional bodies or government are generally more difficult to implement than those run by private companies.

CAPACITIES REQUIRED AND COST	Total costs and costs per beneficiary are low to moderate for certification programmes run by private companies but moderate to high for those run by professional or governmental bodies. They need kills in human resource management. The cost to train a certified community promoter in livestock management in India is USD 975 for a 30 day course and equipping the promoter with a smartphone and kit costs USD 156 (Kumar *et al.*, 2021).
SUITABILITY FOR WORKING WITH LOW LITERACY POPULATIONS	High, as community promoters have knowledge of local culture, practices and the local language.
SUITABILITY FOR WORKING WITH WOMEN AND YOUTH	Moderate. Can be high, particularly when women and youth are encouraged to become community promoters or when promoters are sought for enterprises with women in the majority. In the example from Jharkhand State, India, raising small ruminants is traditionally women's work and over 95 percent of certified animal health workers are women.
OTHER SUITABILITY CONSIDERATIONS	Certification of community promoters is particularly appropriate for high risk and very technical innovations where the cost of an error may be high (e.g. treatment of livestock diseases) or decisions are essentially permanent (location of water control structures).
FINANCIAL SUSTAINABILITY	Medium. Companies managing certification systems may cover most or all certification costs making the process more sustainable. Sustainability is more challenging where professional or governmental bodies operate certification. These may require promoters to pay some of the costs through licensing or membership fees.
STRENGTHS AND CHALLENGES	Certification has the potential to increase the community promotor's credibility, earning power and respect from customers and peers. It also helps improve a person's confidence, reputation and status. The major challenge is the high cost of a certification programme, including setting standards, managing a testing or accreditation system, registering certified persons and maintaining certification over time, such as requiring attendance at refresher courses.

Coaching

DEFINITION	Coaching is a professional, collaborative and outcomes-driven method of learning that seeks to help individuals achieve specific goals and improve performance.
PRINCIPLES	A coach's task is to help the client think through situations, so they can solve problems themselves. Trust, commitment and active involvement are key aspects of the relationship between a coach and a client. Coaches help clients to achieve personal growth, such as improved self-esteem and confidence, and to improve their business skills and performance. A coach needs to have strong listening and questioning skills. Coaches also help clients to access new business contacts and networks (van Coller-Peter, 2020).
IMPLEMENTATION	Mondelêz International uses full time coaches in its Cocoa Life programme to assist cocoa farmers in Côte d'Ivoire, Ghana and Indonesia to improve production. Coaches and farmers together draw up a farm development plan and coaches carry out up to four follow-up visits over the following year to help clients implement the plan (Mondelêz International, 2017). Coaches are either private or public agents who are trained in their role. Enterprise Uganda, a public-private partnership, trains small-scale agro-entrepreneurs in their villages and then assigns coaches to visit them periodically.
FIELDS OF HUMAN CAPITAL DEVELOPED	Technical agriculture, functional, business
CHANGES IN HUMAN CAPITAL SOUGHT	Increased knowledge, skills, education, empowerment, networks
REACH	Limited, because face-to-face, one-on-one interaction is required.
EASE OF IMPLEMENTATION	Identifying suitable coaches may be difficult.
CAPACITIES REQUIRED AND COST	Human resource management skills are needed to identify, train and supervise coaches. Total costs and costs per client are high as coaches are often highly paid, need to be trained in coaching and work one-on-one with clients.

SUITABILITY FOR WORKING WITH LOW LITERACY POPULATIONS	High as interaction is face-to-face or by phone.
SUITABILITY FOR WORKING WITH WOMEN AND YOUTH	High, particularly if female and young clients are matched to female and young coaches.
OTHER SUITABILITY CONSIDERATIONS	While it is useful for a coach to have experience in the enterprise of their clients, it is not necessary. There are many examples of coaches without such experience successfully assisting their clients.
FINANCIAL SUSTAINABILITY	Low, given its high cost and the fact that clients are often unable to pay the costs.
STRENGTHS AND CHALLENGES	A strength of the coaching method is that coaches work with clients on personal issues, such as building confidence and self-esteem, as well as technical and business issues. Because they visit their clients at their workplace, they can engage them in depth and offer customised advice. Challenges of the method are its high cost and that it may be difficult to find suitable coaches for some clients.

Edutainment television (TV)

SYNONYMS/ SUB-CATEGORIES	Educational talk shows, contests and dramas.
DEFINITION	Entertaining TV programmes intended primarily for educational purposes.
PRINCIPLES	Edutainment TV in agriculture seeks to change attitudes about farming, increase people's knowledge about agricultural practices, help them make informed decisions, link farmers to support services and stimulate social action. TV is an important audiovisual aid. The uptake in improved agricultural practices is increased by showing their use in real life, familiar settings. Messages need to be short and simple to sustain viewer interest.
IMPLEMENTATION	Key steps include research and planning, development, production (filming and editing), broadcasting and evaluation/feedback.
FIELDS OF HUMAN CAPITAL DEVELOPED	Technical agriculture, business
CHANGES IN HUMAN CAPITAL SOUGHT	Increased knowledge, skills, networks
REACH	Wide, where shows are broadcast on national TV networks and TV access is high. Social media such as YouTube can further increase reach.
EASE OF IMPLEMENTATION	Difficult, due to the specialized skills required
CAPACITIES REQUIRED AND COST	Capacities are required for directing, producing, researching, scriptwriting and editing. Skills in publicity, campaigning, fundraising and partnership building are also useful. Production costs are high but those per viewer are often low. Engaging the show Shamba (farm) Shape Up in Kenya to produce five six-minute segments for one broadcast cost USD 50 000 in 2016 but with an audience of 3.5 million households the cost per viewing household was only USD 0.014.

SUITABILITY FOR WORKING WITH LOW LITERACY POPULATIONS	High, if they have access to TV and a good understanding of the language that the show is broadcast in.
SUITABILITY FOR WORKING WITH WOMEN AND YOUTH	High, but content should be relevant to both. Factors to consider in producing the shows include topics selected, characters appearing and being interviewed and that the air time of the shows is convenient for women and youth.
OTHER SUITABILITY CONSIDERATIONS	Edutainment TV is most appropriate for relatively simple practices or those with which farmers are familiar. For more complex practices or topics, edutainment TV serves mainly to raise awareness and guide viewers towards other information sources to learn more about the practices.
FINANCIAL SUSTAINABILITY	Low to medium. Financial sustainability is a major challenge but can be overcome by selling company advertisements during the show.
STRENGTHS AND CHALLENGES	Strengths include edutainment TV's wide reach, its appeal to youth and urban dwellers (many of whom farm or have strong rural links), that it is entertaining as well as educational and can be integrated with other complementary methods such as a call centre to respond to viewers' questions. Challenges include the method's high cost, the low penetration of TV in many areas and the difficulty in translating programmes into different languages.

Farmer field schools

SYNONYMS/ SUB-CATEGORIES	Junior farmer field and life schools, farm business schools, field schools
DEFINITION	A participatory education approach that brings together a group of small-scale producers to solve agricultural problems and increasingly, other types of problems such as reducing gender inequality or improving non-farm income generating activities like handicrafts. The approach involves hands-on group learning and improving skills for observation, critical analysis and decision-making.
PRINCIPLES	Farmer field schools (FFS) emphasise learning by doing, that is, through experience rather than passive listening. The farmer group decides what the FFS should address and meets regularly with a facilitator, observing, discussing, asking questions and learning together. Farmers examine different options and make decisions based on agro-ecosystem analysis, a thorough analysis of an agricultural environment considering aspects from ecology, sociology and economics. Whereas past focus has been on solving agricultural problems, FFS has expanded to include such topics as water management, climate change and household livelihood security. Empowerment objectives and learning how to solve problems are often as important as improving crop or livestock yields.
IMPLEMENTATION	A typical FFS working on crop issues meets regularly at a field or elsewhere for hands on training and experimentation throughout the cropping season. The group typically numbers between 20 and 30 and sessions are led by a facilitator, often an extension worker who has undergone training in the FFS approach. Facilitators are in turn backstopped by FFS master trainers.
FIELDS OF HUMAN CAPITAL DEVELOPED	Technical agriculture, functional, business
CHANGES IN HUMAN CAPITAL SOUGHT	Increased knowledge, skills, empowerment, networks, social capital
REACH	Limited to moderate as face-to-face interaction with facilitators is required.

EASE OF IMPLEMENTATION	Moderate to difficult
CAPACITIES REQUIRED AND COST	Master trainers (MT), who train the FFS facilitators, are often MSc or BSc level and facilitators often BSc level. In some places, farmers from the communities are trained to become facilitators. Total costs are high and costs per farmer are moderate to high. Costs vary by subject matter, course length and educational level of facilitators. Costs include needs assessment, curriculum development, trainers, operations, supervision and follow-up. Costs of training FFS facilitators are USD 1000–2000 per facilitator. Costs per trainee are USD 20–40 per cropping season (Waddington and White, 2014).
SUITABILITY FOR WORKING WITH LOW LITERACY POPULATIONS	Moderate to high; to fully benefit, participants should have basic skills in reading, writing and numeracy, though studies have shown good results for low literacy populations, likely due to the hands on nature (Davis *et al.*, 2012).
SUITABILITY FOR WORKING WITH WOMEN AND YOUTH	Moderate to high. Women may face constraints concerning timing of sessions and childcare. Both women and youth may be constrained by social norms from participating in mixed groups. Participation in FFSs can improve gender equity and empowerment of women (Friis-Hansen and Duveskog, 2012).
FINANCIAL SUSTAINABILITY	Moderate to low. Sustainable funding is challenging because of the high costs and skills required. Modalities to increase sustainability include the use of community based farmer facilitators and helping them establish federations to market their services, as was done in Rwanda (Khisa, 2003; Neza *et al.*, 2021).
STRENGTHS AND CHALLENGES	Their focus on problem solving and decision-making make them relevant to a wide range of objectives and topics. They can help build self-confidence and strengthen social capital. Main challenges are the relatively high costs of training facilitators to provide the high quality of training required.

Farmer-to-farmer extension

SYNONYMS/ SUB-CATEGORIES	Farmer trainers, lead farmers, farmer promoters, farmer advisers, community promoters
DEFINITION	Farmer-to-farmer extension (FTFE) provides training to farmers by farmers, often by creating a structure of farmer-trainers (not formally certified).
PRINCIPLES	FTFE can help build effective, farmer-centred extension systems and empower farmers as change agents in their communities. Farmers and their organizations should play a key role in selecting, monitoring and evaluating farmer-trainers. Farmer trainers need strong support from extension systems for training and backstopping and complement existing extension systems, rather than being a substitute for them. Farmer trainers may work for farmer organizations, NGOs, governments or private companies.
IMPLEMENTATION	Roles and responsibilities vary but often include training, following up, advising, conducting demonstrations, organizing meetings and acting as a liaison between farmers and development agents. Farmer trainers often serve a farmer group to which they belong. In some places they receive a salary (e.g. Yachachiq community promoters in Peru) whereas in others, (farmer promoters in the Twigiri Muhenzi programme in Rwanda) they are volunteers (Salcedo du Bois and Zimmerman, 2021; Neza *et al.*, 2021). Their main motivations in such cases are access to knowledge, social recognition and altruism (Kiptot *et al.*, 2016).
FIELDS OF HUMAN CAPITAL DEVELOPED	Technical agriculture
CHANGES IN HUMAN CAPITAL SOUGHT	Increased knowledge, skills
REACH	Moderate
EASE OF IMPLEMENTATION	Moderate

CAPACITIES REQUIRED AND COST	Total costs and costs per beneficiary are low to moderate. Farmer trainers need training in communication as well as technical skills. Most organizations start with several days of residential training. Refresher and on-the-job training are also common. Costs of training and incentives to motivate farmer trainers (e.g. t-shirts and badges) in Africa have been estimated at USD 100–260 per farmer trainer (or USD 4 –10 per trainee) per year (Wellard *et al.*, 2013; Franzel *et al.*, 2019).
SUITABILITY FOR WORKING WITH LOW LITERACY POPULATIONS	High, as farmer trainers have knowledge of local culture, practices and language.
SUITABILITY FOR WORKING WITH WOMEN AND YOUTH	Moderate to high, particularly when a high proportion of women and youth are farmer trainers.
OTHER SUITABILITY CONDITIONS	FTFE may not be appropriate for very technical enterprises (e.g. certain crop spraying operations) or where the cost of an error may be high (e.g. treatment of livestock diseases).
FINANCIAL SUSTAINABILITY	Medium. As the approach is low cost, it is often sustainable, particularly when farmer trainers are based in local institutions and receive backstopping and training from government or other organizations.
STRENGTHS AND CHALLENGES	The approach is relatively low-cost, helps advisory services expand their reach and may improve accountability in the community, helps strengthen communities to access information and improve uptake of new practices. A main challenge is that farmer trainers may perform poorly without adequate training and backstopping. Other challenges may include expectations of financial benefits, high drop-out rates and conflicts between extension agents and farmer trainers.

Farmer training centres

SYNONYMS/ SUB-CATEGORIES	Agricultural training centres, rural resource centres, pastoralist training centres
DEFINITION	Training and demonstration hubs that create opportunities for farmers to: • obtain technical advice, training and services; • link to value chain actors such as input suppliers and processors; • share experiences; and • access inputs such as seeds and seedlings.
PRINCIPLES	Farmer training centres (FTCs) may train farmers on a broad range of enterprises (such as in Ethiopia) or have a particular focus such as agroforestry (Rural Resource Centres in West Africa) or entrepreneurship (Songhai Training Centre in Benin). They may be run by public sector extension agencies, NGOs, farmer organizations or public-private partnerships. Some have a narrow focus on training whereas others have additional objectives: conducting field research trials, promoting networking among farmers and other value chain actors or earning income to help cover training costs.
IMPLEMENTATION	FTCs may have trial and demonstration plots, tree nurseries, a training hall, a small library and office space. Some also have processing units and provide accommodation and catering services for training sessions. Training may be conducted through formal courses, fieldwork or through informal visits by farmer groups.
FIELDS OF HUMAN CAPITAL DEVELOPED	Technical agriculture, functional, business
CHANGES IN HUMAN CAPITAL SOUGHT	Increased knowledge, skills, networks, strengthened social capital
REACH	Moderate
EASE OF IMPLEMENTATION	Moderate to difficult

CAPACITIES REQUIRED AND COST	BSc level trainers and administrators are often required. Costs include land, infrastructure, staff salaries, training and operations. Total cost and cost per trainee are high. Cost recovery is possible through sale of products and training services.
SUITABILITY FOR WORKING WITH LOW LITERACY POPULATIONS	High
SUITABILITY FOR WORKING WITH WOMEN AND YOUTH	Low to moderate. Women and youth may face financial constraints preventing them from travel to FTCs. Women may not have the time to travel to attend courses or they may face cultural restrictions on travel.
OTHER SUITABILITY CONDITIONS	FTCs are particularly relevant for training in technologies that are complex (high costs, high risk or involve decisions that cannot easily be changed) or that take a long time to generate benefits.
FINANCIAL SUSTAINABILITY	Low. Sustainability is challenging due to the high cost of operations. Some costs can be recovered by selling inputs and services but there is a risk that preoccupation with these tasks can reduce the effectiveness of training and other objectives.
STRENGTHS AND CHALLENGES	FTCs have proved effective in many countries for providing knowledge, training, inputs and services to a broad range of different types of farmers, including women and youth. FTCs managed by local organizations, such as the Rural Resource Centres in West Africa, have been particularly strong in responding to local needs and gaining the confidence of local stakeholders. Challenges include the high costs of establishing FTCs, reaching out to farmers further away from the FTCs and the importance of strong and effective leadership and partnerships.

Internships and apprenticeships

DEFINITION	Internships are positions taken by students or trainees who work in an organization, often without pay, to gain work experience or satisfy requirements for a qualification. Apprenticeships are similar but are paid experiences that may lead to full-time employment.
PRINCIPLES	Internships and apprenticeships offer benefits to both young interns and employers in the agricultural sector. Interns and apprentices can gain valuable work experience. Employers can evaluate prospective new hires and leverage lower labour costs. Most programmes target students or graduates of universities or vocational schools. Many interns work directly with farmers, either on farms or as extension agents, sales or buying agents, or providers of services such as credit, crop or livestock insurance. Whereas most interns in the agricultural sector are probably not farmers, many are, such as those in the Agropastoral Training Programme in Cameroon (Takamgang and Lhoste, 2021).
IMPLEMENTATION	Many private companies, NGOs and government agencies working in agriculture host interns without any assistance from outside organizations. Some government agencies or initiatives, such as the Agropastoral Training Programme in Cameroon and the Rwanda Development Board have internships for tertiary students or graduates, placing them on farms, in private companies or government agencies. Donor agencies also sometimes help strengthen internship and apprenticeship programmes. For example, the United States Agency for International Development's Private Sector Driven Agricultural Growth Project added value to the Rwanda Development Board's programme, increasing the number of interns, providing orientation training and extending the internship from six months to one year.
FIELDS OF HUMAN CAPITAL DEVELOPED	Technical agriculture, functional, business
CHANGES IN HUMAN CAPITAL SOUGHT	Increased knowledge, skills, empowerment, networking
REACH	Limited, as available positions on farms and in firms and organizations are limited by the availability of funding and supervisors.

EASE OF IMPLEMENTATION	Moderate
CAPACITIES REQUIRED AND COST	Many organizations and programmes only take on interns with university or tertiary degrees. Costs and costs per intern or apprentice are low when a company takes on an intern or apprentice. Organizing a programme matching students or graduates with companies and organizations may involve moderate costs and costs per intern or apprentice. Human resources management and networking skills are required.
SUITABILITY FOR WORKING WITH LOW LITERACY POPULATIONS	Low
SUITABILITY FOR WORKING WITH WOMEN AND YOUTH	High
FINANCIAL SUSTAINABILITY	High, as both private and public sectors are often willing and able to take on the costs of recruiting and hosting interns and apprentices.
STRENGTHS AND CHALLENGES	Internships and apprenticeships offer an effective way for youth to expand skills, gain experience, develop professional networks and enhance their self-employment and job prospects. They also help youth realise that there are fulfilling careers in farming and agribusiness. Interns benefit their host companies because they are low-cost, often highly motivated and may bring cutting-edge ideas and technology from academia. Internships also help companies streamline their recruitment process, because firms often hire them after they complete their service. Occasional problems arise when interns are not adequately supervised, they are not given work to do or are unable to work due to a limitation (e.g. lack of transport). Internships may also have negative effects if interns are used as a substitute for employing people.

Management advice for family farms

DEFINITION	This is a participatory approach that uses principles from management science to help farmers strengthen their capacities to manage farm and non-farm resources.
PRINCIPLES	In management advice for family farms (MAFF), farmers use the phases of the management cycle, analysis, planning, monitoring, adjustment and evaluation, to assess their farm and non-farm activities and their economic and social environment. Record keeping is critical and farmers use decision support tools to gain an in-depth understanding of their farming systems.
IMPLEMENTATION	There is no standard model as tools and methods need to be adapted to situations. Approaches often involve a needs assessment, group training on agricultural practices based on farmers' needs, management training including record keeping and analysis tools, farm visits, and technical and economic analysis. Farmers plan for the following season based on results of the analysis. The learning process involves exchanges of experiences, self-analysis of farmers' production and economic situation, field visits, on-farm trials and group training. In Benin, the Ministry of Agriculture's MAFF advisors work with 7 to 9 groups (10 to 30 farmers per group) (Faure *et al.*, 2018). A farmer facilitator is selected and trained from each group and takes on certain advisory functions.
FIELDS OF HUMAN CAPITAL DEVELOPED	Technical agriculture, functional, business
CHANGES IN HUMAN CAPITAL SOUGHT	Increased knowledge, skills, empowerment, networking
REACH	Limited
EASE OF IMPLEMENTATION	Moderate to difficult
CAPACITIES REQUIRED AND COST	The main costs are for MAFF managers and advisers, training costs and backstopping activities. Costs and costs/beneficiary are high, ranging from USD 20–80/beneficiary/year for programmes in Africa. Once farmer facilitators take on more functions, costs are lower, USD 2–20 per beneficiary/year (Faure *et al.*, 2015).

SUITABILITY FOR WORKING WITH LOW LITERACY POPULATIONS	Low to moderate. Assessments are based on record keeping, requiring literacy. MAFF has developed tools for illiterate farmers to use.
SUITABILITY FOR WORKING WITH WOMEN AND YOUTH	Low to moderate. Women and youth may not benefit because the approach focuses on a single member per household who is usually the male household head.
OTHER SUITABILITY CONSIDERATIONS	MAFF is best suited to farmers who are literate and active in markets.
FINANCIAL SUSTAINABILITY	Low. Sustainability is a major challenge as MAFF is highly dependent on international aid. There may be some scope for funding from public sector extension agencies or downstream, private-sector value chain actors marketing high value products.
STRENGTHS AND CHALLENGES	MAFF's holistic approach considers all household enterprises not just agricultural ones. MAFF's analysis methods empower farmers to make sound decisions concerning their enterprises and practices. Farm-level data can be assembled to improve decision-making at the producer organization level as well. Main challenges are MAFF's relatively high costs, the need for highly qualified advisers to implement it and challenges servicing resource-poor farmers, particularly those with low literacy levels.

Radio

PRINCIPLES	Radio is one of the most popular information sources on agriculture, mainly due to its accessibility, affordability and availability in many different languages. Whereas traditionally it was a one way communication tool, it can be integrated with other ICTs, such as mobile phones and SMS, for two way communication. Radio provides platforms for dialogue and discussions and for producing entertaining and interactive programmes such as dramas and talk shows. Participatory, demand-driven radio, such as that promoted by Farm Radio International, can elicit farmers' preferences and opinions, raise awareness about services and events, host agricultural campaigns, link farmers to service providers, disseminate information and facilitate discussion.
IMPLEMENTATION	Conducting a needs assessment of potential audiences is an important starting point and can help guide decisions on timing, formats, content and knowledge brokers (e.g. from research, private companies and educational institutions). Skilled broadcasters can help extension and other agricultural specialists to package information into programmes that attract and engage listeners. Monitoring and evaluation of programming including audience surveys are essential for assessing impact and guiding improvements.
FIELDS OF HUMAN CAPITAL DEVELOPED	Technical agriculture, business
CHANGES IN HUMAN CAPITAL SOUGHT	Increased knowledge, networking
REACH	Moderate to wide, depending on the station(s) coverage
EASE OF IMPLEMENTATION	Preparation of programmes and content may be easy for a simple interview but difficult for other formats, such as a drama.

CAPACITIES REQUIRED AND COST	Costs range from low to high, depending on the production costs of a show (high for a drama, low for an interview). But even if costs are high, cost per listener is often low. An important prerequisite is that a radio station has the interest and ability to cover agricultural topics.
SUITABILITY FOR WORKING WITH LOW LITERACY POPULATIONS	High, particularly when programming is available in local languages.
SUITABILITY FOR WORKING WITH WOMEN AND YOUTH	High, particularly when programmes address topics and enterprises of importance to women and youth. It is important to ensure that programming times suit the target audience. Where many women lack access to a radio, the formation of women's listening groups has proved an effective means of increasing access, as with the IFAD Her Radio Project in Ethiopia, United Republic of Tanzania, Malawi and Uganda (IFAD, 2022a).
OTHER SUITABILITY CONSIDERATIONS	Programmes can be localized using community stations for locally available information or presented via regional or national level stations in cases where the topic is relevant across larger areas.
FINANCIAL SUSTAINABILITY	Medium. Low costs and the possibility of recuperating costs through advertising during broadcasts contribute to the sustainability of radio programming, as does training radio broadcasters to produce agricultural shows.
STRENGTHS AND CHALLENGES	Radio is inclusive, accessible, affordable and has a high potential to reach marginalized groups including the poor and those in remote areas. However, some radio stations lack the capacity to work in agriculture. Radio's lack of a visual feature means that it should often be complemented by visual approaches (face-to-face extension, videos or television).

Study tours and farmer exchange visits

DEFINITION	Study tours involve visits by farmers to other farmers or agricultural sites, such as research stations, processing plants or training centres. Farmer exchange visits, a subcategory of study tours, are visits by farmers to other farmers outside their location to observe their farming practices and exchange views and experiences.
PRINCIPLES	The participants, both those visiting and those hosting, need to be involved in planning, implementing and evaluating the visit. Planners need to be explicit about how farmers will benefit from the visit, avoiding the problem, for example, of visiting a wealthy farmer who is implementing practices that the visitors cannot afford. Attention also needs to be given to practical logistics and the principles of adult learning and participatory development, to ensure effective peer-to-peer interaction leading to behavioural change.
IMPLEMENTATION	Study tours and exchange visits need to be carefully planned to achieve the greatest impact. Before the visit, the first step is to define objectives and select participants. Next is to define roles and responsibilities, location, timing and duration of the visit, financial organization, materials required and preparation of visit content. During the visit, it is critical to ensure that all participants have the opportunity to listen, communicate, observe and interact with the hosts. Documenting the process (notes, photos, video) helps ensure that highlights of the visit can be shared with those who could not attend. Feedback meetings and impact assessments (e.g. determining if behaviours changed) help assess the value of study tours and how to improve them.
FIELDS OF HUMAN CAPITAL DEVELOPED	Technical agriculture, business
CHANGES IN HUMAN CAPITAL SOUGHT	Increased knowledge, skills, networking, social capital
REACH	Limited
EASE OF IMPLEMENTATION	Easy to moderate. In some instances, farmers and their organizations plan and pay for such visits without outside assistance.

CAPACITIES REQUIRED AND COST	Costs and costs per participant are low to moderate. Costs include transport, meals and accommodation. In some countries such as Kenya, farmers share or pay for all the costs (Wambugu *et al.*, 2001).
SUITABILITY FOR WORKING WITH LOW LITERACY POPULATIONS	High, as literacy is not usually needed
SUITABILITY FOR WORKING WITH WOMEN AND YOUTH	Moderate. Efforts must be made to ensure that women and youth can participate (e.g. specifically inviting them and, for women, providing childcare and overcoming cultural barriers on travel).
SUSTAINABILITY	High, as it is common for farmers and farmer organizations in many countries to organize and finance their own study tours and exchange visits. Further, a visit does not imply ongoing costs but can be organized each time there is interest.
STRENGTHS AND CHALLENGES	Strengths are the opportunities to see how others manage their farms and interact with them discussing their problems and achievements. The tours and visits also allow farmers to discuss their work and the services they provide with other agricultural sector and value chain actors. Tours and visits help farmers and their hosts to strengthen social networks. Challenges include ensuring that logistics are smooth, that interaction and discussion are sufficient, and that results and experiences are shared with those who could not attend.

Videos

DEFINITION	Digital or videotape recordings provide an audiovisual medium for disseminating information, knowledge and practices. Different types of videos include documentaries, instructional videos, farmer learning videos and participatory videos made by farmers.
PRINCIPLES	Video content should be based on farmers' needs and scientific and good practice principles. The more farmers are involved in producing the video and are depicted in it, the more relevant it will be to viewers. Video producers need to include a range of different types of people in the video, representing various groups in the community. To engage viewers, a video must have high quality audio and visual, a relevant message and a compelling story.
IMPLEMENTATION	There are six basic steps: choosing a topic, planning, producing the video, validating, distributing, and monitoring/evaluation. Videos can be just a few minutes long and should not be longer than 20 minutes. Videos can be distributed directly to farmers or through extension services, television, smart phones, social media, value chain actors and farmer organizations. Some agencies use a structured approach for video-based training with farmers organized in video viewing clubs with support from facilitators. The Government of Ethiopia, with support from Digital Green, operates such a video-based extension programme (Bernard *et al.*, 2016).
FIELDS OF HUMAN CAPITAL DEVELOPED	Technical agriculture, business
CHANGES IN HUMAN CAPITAL SOUGHT	Increased knowledge, skills, networking
REACH	Wide, if farmers have the means to view them.
EASE OF IMPLEMENTATION	Easy to moderate, depending on the quality and degree of structure desired.

CAPACITIES REQUIRED AND COST	Costs for producing and distributing videos may be moderate to high but cost per viewer may be very low when videos are widely viewed. For videos developed by film professionals, the team should consist of a camera operator and persons who understand local farming systems, communities and culture. Farmers developing videos require professionals to train them in using equipment and techniques. Improved access to videos through mobile phones and the internet is reducing viewing costs.
SUITABILITY FOR WORKING WITH LOW LITERACY POPULATIONS	High as literacy is not necessary
SUITABILITY FOR WORKING WITH WOMEN AND YOUTH	Good if women and youth have access to the means of viewing them.
OTHER SUITABILITY CNSIDERATIONS	The proliferation and improved quality of mobile phones has made it much easier to view videos, especially for youth with access.
FINANCIAL SUSTAINABILITY	Medium. Training a cadre of video producers who can develop agricultural programmes helps make high quality video sustainable.
STRENGTHS AND CHALLENGES	Videos complement more traditional approaches within education, extension methods and mass media. Videos involve verbal and visual communication, making it possible to present and explain complex operations and underlying principles. Processes such as crop or animal growth that take place over months or years can be depicted in just a few minutes. The challenges are the cost of production, the fact that communication flow is one way, and that they rely on devices to view the videos. Embedding video in an extension system as with Ethiopia ensures that farmer groups can meet to discuss the video and ask the extension agent questions.

Village agents

SYNONYMS/ SUB-CATEGORIES	Sales agents, field agents
DEFINITION	Persons selling inputs or services. They are either self-employed or work for private companies or NGOs. Some also buy produce or link farmers to buyers.
PRINCIPLES	While the main role of village agents is to sell inputs and services, some also manage demonstration plots and advise and train farmers on how to use the products and services they sell, including seeds, fertiliser, plant protection products, credit, insurance and marketing. Providing advice to farmers can be profitable for a private company if it helps the company to increase the volume of inputs they sell and produce they buy from farmers.
IMPLEMENTATION	In Uganda, many village agents use digital apps for farm profiling, that is, they map farmers' fields and assemble information on their area under cultivation and input requirements useful for estimating yields, marketable surplus and income. They also help farmers link to other development actors and service providers. Some help farmers to "bundle" services, as when they sell inputs to farmers on credit and deduct the cost from sales of farmers' produce. Some employers provide their agents and customers with apps that provide farmers with agronomic tips and information on weather and market prices (Franzel *et al.,* 2020).
FIELDS OF HUMAN CAPITAL DEVELOPED	Technical agriculture, business
CHANGES IN HUMAN CAPITAL SOUGHT	Increased knowledge, skills, networking
REACH	Moderate
EASE OF IMPLEMENTATION	Moderate

CAPACITIES REQUIRED AND COST	Costs include training village agents, salaries, commissions, equipment and supervision and backstopping costs. Costs of employing village agents are high and moderate to high per customer served. Many companies find that employing village agents is profitable because of their positive impact on sales.
SUITABILITY FOR WORKING WITH LOW LITERACY POPULATIONS	High, since agents work face to face with farmers
SUITABILITY FOR WORKING WITH WOMEN AND YOUTH	High, for youth, many village agents are young people, over 75 percent in Uganda. But moderate suitability for women as the number of agents who are women is often low, 16 to 33 percent in Uganda (Franzel *et al.*, 2020).
FINANCIAL SUSTAINABILITY	High, particularly when they are employed by the private sector
STRENGTHS AND CHALLENGES	Strengths are that village agents can link farmers to a range of inputs and services and help them determine the types and levels of inputs they need. Challenges are that village agents may not be able to provide valuable advice to farmers without adequate training and backstopping. Also, they may not have any incentive to promote practices that conserve public goods (e.g. soil conservation) and they are likely to be biased regarding the inputs and services they sell (e.g. mineral fertilizer) as compared to other practices (e.g. compost and manure).

WhatsApp and other social media discussion groups

DEFINITION	WhatsApp discussion groups are groups of individuals interested in a particular topic who exchange information and experiences about it. Whereas these groups mainly use WhatsApp, other apps, either public or proprietary, are also used.
PRINCIPLES	The WhatsApp groups provide the means for as many as 256 members to access information, ask and reply to questions, buy and sell products and share experiences, problems and solutions. In addition to texting or voice messages, users can also share images, links, and videos. In contrast to many human capital development methods, information circulates among users and not top-down from experts to farmers. Groups form communities of practice as: 1) they have an identity defined by a shared interest; 2) they help each other and share information and experiences; and 3) they develop a shared stock of resources including experiences, tools and practices.
IMPLEMENTATION	Farmers and others interested in exchanging information on agriculture such as producer organizations or extension agents establish these groups. Groups may be organized by topic, region, or a combination of these. One or more administrators may be tasked with keeping discussions on topic. In Colombia, members of the Colombian Cattle Growers' Association use WhatsApp to buy and sell cattle without intermediaries, reducing costs and avoiding the risks of moving cattle to markets. They also exchange information on practices (Davis *et al.*, 2021). In Madhya Pradesh State, India, over three-quarters of farmers surveyed reported using new crop management practices after learning about them on WhatsApp (Naruka *et al.*, 2017).
FIELDS OF HUMAN CAPITAL DEVELOPED	Technical agriculture, business
CHANGES IN HUMAN CAPITAL SOUGHT	Increased knowledge, networking
REACH	Medium. Limited to persons with internet devices, most commonly smartphones

EASE OF IMPLEMENTATION	Easy, as groups may be formed by producers without external support.
CAPACITIES REQUIRED AND COST	Smart devices are required and users must know how to use WhatsApp. Costs of organizing a group are low but overall costs and costs per user are high because smartphones are required. If the producer already has a smartphone then costs are low.
SUITABILITY FOR WORKING WITH LOW LITERACY POPULATIONS	Low, as text messaging is commonly used.
SUITABILITY FOR WORKING WITH WOMEN AND YOUTH	Low to moderate, depending on whether they have access to smartphones.
FINANCIAL SUSTAINABILITY	High, as costs are minimal and external support is not needed.
STRENGTHS AND CHALLENGES	The strength of WhatsApp groups is that they offer an inexpensive, easy and convenient way to communicate with other farmers. WhatsApp is useful for buying and selling produce, reducing transaction costs since buying and selling can be done virtually instead of having to travel to markets. Challenges are that many farmers do not have smartphones or live in areas without electricity or internet coverage. Others have smartphones but are unaware of WhatsApp groups or how to join them. Challenges within a WhatsApp group include difficulties in assessing the validity of information provided, having to sift through an overload of information or not finding the information relevant or comprehensible.

PRINCIPLES FOR SELECTING WHICH HUMAN CAPITAL DEVELOPMENT METHODS TO USE

It is not possible to create an algorithm to select which methods one should use in developing human capital. However, in this section, we assemble data from the preceding sections into tables to facilitate systematic comparison of methods across selected criteria. Data in the tables are organized according to four questions that many planners will ask when considering initiatives to improve human capital in agriculture.

- What if any formal educational or training programmes are needed? Options in the tables are for agricultural vocational schools, farmer training centres or internships and apprenticeships.[3]
- What if any extension methods with field staff are needed? Options in the tables include certified community promoters, farmer field schools, farmer-to-farmer extension, management advice for family farms, and village agents.
- What if any digital methods are needed? Options in the tables include agricultural call centres, edutainment television, radio, videos or WhatsApp discussion groups.
- What if any periodic methods are used? Options in the tables include agricultural fairs and shows, coaching and study tours and farmer exchange visits.

The first step in deciding which methods to use is to specify types of human capital that are to be improved and changes sought in using different methods. This is done based on a participatory and comprehensive assessment of the needs of the target population, as discussed in the "framing building block" in Module 3. The assessment should define the target population's main sub-groups (e.g. women, youth, different types of producers), their assets, resources, literacy and access to digital technologies. It also needs to consider the socioeconomic context including government policies, past initiatives to develop human capital and the activities of other institutions working in the area.

Table 4.1 breaks down the methods into four categories: formal education or training methods (three methods), extension methods involving field staff (five methods), digital methods (five methods) and periodic methods (three), that is, methods such as fairs. The table presents the potential of different methods to develop producers' capital in technical agriculture, functional and business areas. All methods are suited to helping producers develop capabilities in technical agriculture and nearly all, except for call centres, farmer-to-farmer extension and village agents, can contribute to developing capabilities in business. The weakest area is functional capabilities, only six of the 16 methods can contribute to this.

3 Internships and apprenticeships are not classified as formal methods in Section 2 of this module but are grouped with formal programmes here because they are often required to obtain degrees in academic or vocational programmes or they follow such programmes.

Table 4.1 presents the potential for different methods to generate changes in certain capabilities, that is, increasing knowledge, skills, education, empowerment, networks and social capital. All methods contribute to increasing knowledge and all contribute to some extent to improving producers' skills. Of course, there is considerable variation in each one's potential contribution to learning a particular skill. For example, since radio lacks a visual element, its contribution is limited when learning skills that require observing the skill being performed.

Table 4.1
Potential for methods to improve human capital, and changes sought

	Types of capital			Changes in human capital sought: increases in					
	Tech. Ag	Functional	Business	Knowledge	Skills	Education	Empower-ment	Networks	Social capital
Education methods									
Agricultural vocational schools	✓	✓	✓	✓	✓	✓		✓	✓
Farmer training centres	✓	✓	✓	✓	✓			✓	✓
Internships and apprenticeships	✓	✓	✓	✓	✓	✓	✓	✓	
Extension methods involving field staff									
Certified community promoters	✓		✓	✓	✓		✓		
Farmer field schools	✓	✓	✓	✓	✓		✓	✓	✓
Farmer to farmer extension	✓			✓	✓				
Management advice for family farms	✓	✓	✓	✓	✓		✓	✓	
Village agents	✓		✓	✓	✓			✓	
Digital methods									
Agricultural call centres	✓			✓				✓	
Edutainment TV	✓		✓	✓	✓			✓	
Radio	✓		✓	✓	✓			✓	
Videos	✓		✓	✓	✓			✓	
WhatsApp and other social media discussion groups	✓		✓	✓				✓	
Periodic methods									
Agricultural fairs and shows	✓		✓	✓				✓	
Coaching	✓	✓	✓	✓	✓	✓	✓	✓	
Study tours and farmer exchange visits	✓		✓	✓	✓			✓	✓

SOURCES: Authors' own data.

Three methods contribute to formal education – agricultural vocational schools, coaching and internships. Other methods such as video are commonly used in education but these three are highlighted because of their importance. Only four methods contribute significantly to enhancing producers' empowerment: internships, farmer field schools, management advice for family farms and coaching. All methods except two, farmer to-farmer extension and certified community promoters, contribute to enhancing farmers' networks. Only four methods make significant contributions to increasing farmers' social capital: agricultural vocational schools, farmer training centres, farmer field schools and study tours/farmer exchange visits. But, as stated in Module 1, tools that aim specifically at improving producer organizations' capabilities are excluded from this study although some, such as FAO's Dimitra groups (FAO, 2019), can help to strengthen producers' social capital.

Table 4.2 presents the performance of human capital development methods across selected assessment criteria introduced in Section 2 of this module. The reach of different methods is evenly distributed across the wide, medium and limited categories with digital technologies (edutainment TV, radio and videos) having the widest reach. Only a few methods were easy to implement, such as WhatsApp groups and study tours. The implementation costs were mostly high, but some, particularly digital methods such as edutainment TV and call centres, had low costs per user because they can be disseminated widely. Most methods were suitable to producers with low literacy levels.

Most were also suitable to women and youth, though efforts are often needed to ensure they are included, such as separate groups for youth where their participation in the presence of elders is limited due to social mores. Ensuring training sessions take place at times convenient to women can help boost their participation. Poor producers' access to smartphones is also an important constraint limiting their use of digital technologies. Some initiatives found innovative ways to reduce such barriers, such as promoting women's listening groups to hear radio shows (IFAD, 2022a).

Table 4.2

Performance of human capital development methods across selected assessment criteria

	Reach			Ease of implementation			Cost			Cost/user			Suitability low literacy			Suitability women (W) and youth (Y)		
	Wide	Mod.	Limited	Easy	Mod.	Diff.	Low	Mod	High	Low	Mod	High	High	Med	Low	High	Med	Low
Education methods																		
Agricultural vocational schools		✓	✓			✓			✓			✓			✓	Y	W	
Farmer training centres		✓			✓	✓			✓			✓	✓				Y/W	Y/W
Internships and apprenticeships			✓		✓		✓	✓		✓	✓				✓	Y/W		
Extension methods involving field staff																		
Certified community promoters		✓			✓	✓		✓			✓		✓				Y/W	
Farmer field schools		✓	✓		✓	✓			✓		✓	✓	✓	✓		Y/W	Y/W	
Farmer to farmer extension		✓			✓		✓	✓		✓	✓		✓			Y/W	Y/W	
Management advice for family farms			✓		✓	✓			✓		✓	✓		✓	✓		Y/W	Y/W
Village agents		✓			✓			✓	✓	✓	✓					Y	W	
Digital methods																		
Agricultural call centres		✓				✓				✓	✓		✓			Y/W	Y/W	
Edutainment TV	✓					✓				✓			✓			Y/W		
Radio	✓	✓			✓			✓		✓			✓			Y/W		
Videos	✓			✓	✓			✓		✓	✓		✓			Y/W	Y/W	
WhatsApp and other social media discussion groups		✓		✓				✓			✓				✓		Y/W	Y/W
Periodic methods																		
Agricultural fairs and shows		✓				✓			✓	✓	✓		✓			Y	W	W
Coaching			✓			✓			✓			✓				Y/W		
Study tours and farmer exchange visits			✓	✓	✓			✓		✓			✓				Y/W	

SOURCES: Authors' own data; criteria adapted from David and Cofini. 2017. *A decision guide for rural advisory methods*. Research and Extension Unit. Rome, FAO.

It is also possible to broadly rank methods according to the contribution they make to improving human capital. In Table 4.3, methods are grouped into three categories: high, medium/high, and medium. Of course, the contribution that a method makes will vary depending on how it is implemented, what other complementary methods are used and a host of other factors. But it is possible to generalise to some extent and say, for example, that a method using highly trained master trainers and facilitators, such as farmer field schools, will on average, contribute more to increasing producers' capabilities than one with minimal facilitator training, such as most farmer to farmer extension approaches.

Table 4.3
Usefulness of methods in developing human capital

	Degree of usefulness in developing human capital		
	High	Medium–High	Medium
Education methods			
Agricultural vocational schools	✓		
Farmer training centres	✓		
Internships and apprenticeships	✓		
Extension methods involving field staff			
Certified community promoters		✓	
Farmer field schools	✓		
Farmer to farmer extension			✓
Management advice for family farms	✓		
Village agents			✓
Digital methods			
Agricultural call centres			✓
Edutainment TV		✓	
Radio		✓	
Videos	✓		
WhatsApp and other social media discussion groups	✓		
Periodic methods			
Agricultural fairs and shows		✓	
Coaching	✓		
Study tours and farmer exchange visits	✓		

NOTE: Usefulness is the degree to which the method helps producers develop human capital and apply it to improve their livelihoods.

SOURCES: Authors' own data.

PRINCIPLES FOR USING MULTIPLE METHODS

In developing human capital, it is almost always beneficial to use multiple methods. The principles below provide some guidelines on which methods and which types of methods to use together.

1. **Use multiple methods to reinforce learning.**
Different methods often reinforce each other. Farmers learning about how to prepare silage for their cattle from an extension agent will benefit from learning about the same practice from members of their WhatsApp group or from watching a video on YouTube. Receiving similar information from different channels helps ensure it is retained and the required steps taken, for example to purchase recommended inputs.

2. **Use multiple methods to offer validation.**
A farmer hearing about silage preparation from a single agent may wonder how valid the information is. Getting more information from the video and discussing with several farmers on WhatsApp about preparing silage helps validate the original source.

3. **Use multiple methods to offer elaboration.**
In the above example, whereas the extension agent describes how to prepare silage, watching a video adds the visual aspect. Videos are particularly useful because they can show the silage process at different stages – how to dig the pit, how to pack the grass into the pit, how to cover the pit and what the silage looks like when it is ready for feeding. The visual aspect and showing the process at different stages are particularly important for innovations and processes that take a long time to yield benefits, such as tree and livestock enterprises.

4. **Use digital methods to complement face to face methods.**
The two digital methods, video and the WhatsApp group, offer reinforcement, validation and elaboration of the first method, the extension agent. They also have important advantages – they can be used over and over at the producers' convenience, the video can show different stages of an agricultural practice over time, and the WhatsApp group allows farmers to exchange views and experiences by text, images and videos. Both allow the farmer to store and retrieve information on their smartphones although the main disadvantage is the need for smartphones, although videos can also be viewed on other devices if the producer has access to them.

5. **Select methods that target different audiences, particularly to reach marginal groups.**
Some methods are more appropriate for certain audiences than others. Study tours are a valuable way for farmers to learn about new practices, but they often attract more men than women because of social taboos restricting women from travelling or because women have domestic responsibilities that keep them at home. Organizing training events through women's group meetings in which videos featuring new practices are shown may be a more appropriate way of helping women in such cases. The problem of low women's participation in a particular human capacity development method may have more to do with the way women were approached to participate than the method itself. Coffee training events in Uganda tended to attract a very high

proportion of males until Technoserve, the organization managing the sessions, took proactive steps to motivate women and make it easier for them to attend. Event organizers explicitly encouraged women to attend, changed the timing of training events to suit women and offered childcare services during the sessions. As a result, the proportion of women attending significantly increased (Technoserve, 2012). Such programme tweaks can also ensure training reaches other marginalized groups, such as youth, the disabled and Indigenous Peoples. For example, with support from several donor organizations, NGOs and private companies, Mediae Ltd launched a TV show in Kenya and United Republic of Tanzania in 2017 aimed at increasing agricultural entrepreneurship among youth. The show, called "Don't Lose the Plot", follows young farmers as they put their farming skills to the test to compete for cash prizes.

6 **Use higher cost, higher quality human capital development methods alongside lower cost, lower quality ones when resources are limited.**

Human capacity development is expensive and many initiatives face the problem of a shortage of staff or the resources to pay them. For example, in Rwanda, the government appreciated the FFS approach as a means to improve crop yields and farmer livelihoods but could not afford to implement it in all 14 200 of Rwanda's villages. Instead, they chose to introduce it on a limited scale, recruiting and training about 2500 FFS facilitators. At the same time, they recruited and trained 14 200 farmer promoters, one for each village. Farmer promoters are less qualified and work voluntarily but play an important role hosting demonstration plots, providing training on a few practices, and linking farmers to development agents. Farmer trainers were linked to nearby FFS facilitators so they could benefit from the FFS findings and experiences and share these with their peers (Neza *et al.*, 2021).

Similarly in Jharkhand State, India, the Jharkhand Opportunity for Harnessing Rural Growth Project recruited and trained livestock advisers at two different levels for similar reasons as in Rwanda. Both master trainers and community service providers in Jharkhand are certified but master trainers have more training and experience and are thus able to carry out tasks that the community service providers cannot, such as vaccinations and castrations. There are currently 63 master trainers and 1500 community service providers in Jharkhand (Kumar *et al.*, 2021).

7 **Formal training and vocational education programmes often need to be accompanied by other methods to ensure students can find a job or become self-employed.**

Planners often assume that students on training or vocational programmes can easily enter employment or self-employment at the end of their studies. But needs assessments often find that students need further support to develop their human capital before, during and after they complete their studies (Figure 1). First, it was sometimes found that their primary and secondary education was inadequate. Agropastoral vocational training schools in Cameroon addressed this problem by providing coaches to develop students' foundational skills such as literacy and numeracy (Takamgang and Lhoste, 2021). Coaches also helped the students with other skills they needed, such as writing and public speaking.

At the end of training, “one on one” interventions to help trainees settle into jobs or develop businesses are often needed, such as apprenticeships, internships, or job coaching. The Cameroon programme used both internships and job coaching successfully to help graduates develop their skills and transition into jobs or self-employment. Also frequently needed is help to access financial services, particularly for those who are self-employed (Figure 4.1). This not just about obtaining loans but includes opening a bank account, joining a savings and loan group or learning to keep financial records to establish creditworthiness.

Many methods are available to improve human capital. It matters a great deal which ones a programme uses depending on which fields and types of human capital are needed, the target groups in the population, the available resources including partner capacities and the importance of different assessment criteria such as a method’s reach, ease of implementation and cost. A further complication is that while some methods are more effective than others, the performance of each depends on its design and implementation. This highlights the importance of thorough, participatory assessments to decide which methods to use, careful implementation of those methods and rigorous monitoring, evaluation and learning during and following the programme.

Multiple methods are almost always desirable as no single method is a silver bullet.

Using different methods reinforces learning as these are often highly complementary, in the way they promote learning and reach different target groups.

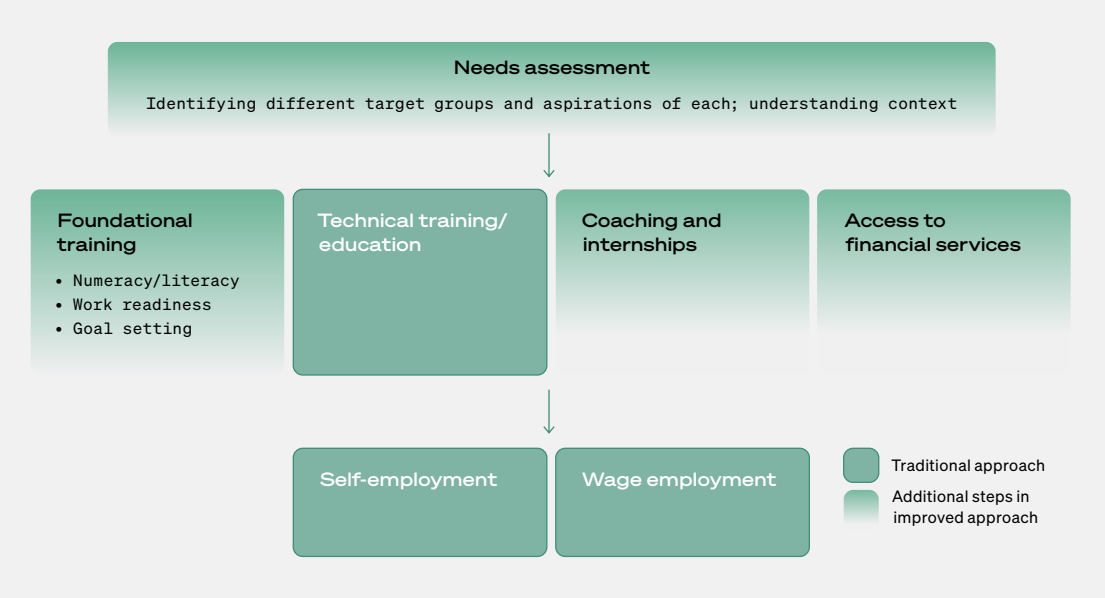


Figure 4.1
Human capital development methods useful for supplementing technical training and education to achieve self- and wage employment

SOURCE: Adapted from EDC (Education Development Center). 2018. USAID *Huguka Dukore Akazi Kanoze Annual Report*. Washington, DC, USAID and Kigali, Educational Development Center. www.edc.org/usaid-huguka-dukore-akazi-kanoze-annual-report-2018.

Module 5
A deep dive into two agriculture human capital investment cases

Learning objective

To be able to cite examples from these cases and apply them to other modules. This module provides two in-depth case studies to apply learning from the other modules and to give examples.

INTRODUCTION

The first case is an example of a human capital development method through use of certified community promoters. This is referred to as the Jharkhand Opportunities for Harnessing Rural Growth (JOHAR) project and community service providers (see Module 4) in the state of Jharkhand in India. This case study was analysed in detail by Kumar *et al*. (2021). In the toolkit we apply the lessons learned from the various modules to this model.

The second case is farmer to farmer extension (Haku Winay/Noa Jayatai) using Yachachiq, who are local promoters hired to implement community projects in Peru. More can be seen on this case in Salcedo Du Bois and Zimmerman (2021).

Both are examples of extension methods involving field staff. However, JOHAR involves more formal, certified community providers of extension services, while Haku Winay/Noa Jayatai uses farmer to farmer extension. The community promoters are trained but not formally certified. JOHAR community service providers are certified by the Agriculture Skills Council of India and paid by the community, with a supplementary payment of INR 1200 (USD 15) per month from JOHAR along with profits from the sale of inputs to livestock farmers.

Another difference is in the type of AHCI (Module 1). JOHAR is a typical project financed through an international financial institution with an implementing partner and strong local government involvement. It is a six-year project (2017–2023).

Haku Winay/Noa Jayatai is an example of strong government commitment and support to developing AHC over a much longer period. The Government of Peru has run the programme since 2014, financed by the Cooperation Fund for Social Development (FONCODES), an executive branch of the Ministry of Development and Social Inclusion of Peru.


©Unsplash/Gyan Shahane

Case study 1

Jharkhand Opportunities for Harnessing Rural Growth Project in India

BRIEF PROJECT DESCRIPTION

JOHAR is an encompassing public project, initiated in 2017. Its "project development objectives" are to enable rural producers and producer collectives to diversify and add value to their production, achieve resilience, access markets, participate in the private sector and finally to develop skills. The latter is particularly relevant within a specific sub-component of the JOHAR project, namely the livestock development component, which is our focus in this case study.

The Jharkhand State Livelihoods Promotion Society (JSLPS) implements the livestock development component of JOHAR, focusing primarily on women livestock farmers. Its overall objectives are asset creation, productivity enhancement, risk reduction related to climate change via diversification and market access for selected livestock (broilers, layers, pigs, goats and dual purpose backyard poultry). These objectives are achieved partially through a human capital development method of certified community promoters (see Module 4).

Female livestock farmers in Jharkhand are trained and certified in paraveterinary skills and called Ajivika Pashu Sakhis (APS) or livestock friends. The APS offer inputs, advice and support on productivity issues (breeding, feeding, animal health, shed construction) and are responsible for training 50–100 other female livestock farmers in their respective villages. Some APS go on to become master trainers (MTs) through additional training, and they in turn train new APS. The JOHAR project thereby invests in the AHC of women livestock farmers in Jharkhand through a cascading farmer to farmer method.

The next section follows the building block structure of Module 3 but skips certain building block elements as they are less relevant to this case.

FRAMING BUILDING BLOCK

A Farmers: Jharkhand, the livestock sector and women

Livestock is one of the fastest growing sectors and a promising sector for small and landless farmers in Jharkhand. It accounts for a quarter of household income and the primary source of earnings for about one-fifth of agricultural households with small parcels of land. Nevertheless, at 37 percent Jharkhand has the second highest poverty rate in the country. Progress across social groups is uneven, with scheduled castes, scheduled tribes and women performing significantly worse than other social groups. Half of tribal peoples, 27 percent of all households in Jharkhand, are poor.

Several challenges exist within the livestock sector and limit its contribution to rural household incomes. Firstly, livestock farmers have limited access to irrigation, skills, markets and finances. Secondly, productivity is low (less than 12 percent of that in other states) due to domestication of local breeds and inadequate quality and access to veterinary services. This has meant high livestock mortality (over 30 percent loss of goats, and up to 80 percent of pigs and poultry), egg production at 30 percent below its potential and livestock for meat products requires 4–6 times longer to reach ideal market weights.

Women livestock farmers, the JOHAR target group, face additional challenges. They live in a typical rural patriarchal society with gender biases against women and have limited decision-making power and opportunities. Women are expected to stay at home and do household work while income and skill related activities are considered men's domain. Many of the targeted women also face challenges from limited or no access to land as well as biases against their ethnic groups.

The main opportunity for change from the JOHAR project lies within the nexus of the livestock sector and women, who account for over 70 percent of production. Local market prices in India for meat and eggs have increased by 70–100 percent in the past decade and pushed up farm gate prices. Diversification to high-value livestock breeds could more than double a household's primary income. Livestock rearing is an activity where women play a critical role and represents an opportunity to enhance their human capital to acquire new skills, take decisions that increase family income and contribute towards women's empowerment.

B Institutions: an existing institutional platform of women livestock farmers

Women in Jharkhand are organizing into self-help groups. These typically have 10–20 members, meet weekly and save around INR 10 per week per person in a personal savings – the total amount saved by all members is treated as a community fund. Apart from the savings, the members deal with gendered roles in their communities, livelihood issues, credit requirements and access to government schemes. At district level, 10–15 self-help groups are organized into village organizations and 20–30 village organizations are in turn organized into a cluster level federation. The latter two group formations meet twice a month to manage financial transactions and livelihood plans. There is thus a wide three-tiered network of female livestock farmers in Jharkhand.

This institutional platform of self-help groups derives from another institution, the National Rural Livelihoods Mission, a national poverty alleviation programme also implemented by JSLPS and funded by the World Bank. The Mission shows that community managed institutions for poor smallholders or landless farmers can function as efficient partners in livelihood enhancement. This institutional platform of self-help groups has facilitated a large cadre of women community leaders, mobilizers and resource personnel as well as greater participation by women in decision-making. This network is therefore highly relevant for implementing JOHAR. The cluster level federations are registered as societies under the Societies Registration Act, 1860, giving them formal non-profit status.

C Providers: existing human capital development – or lack thereof

Veterinary services and basic animal care services are extremely limited in Jharkhand. There are very few private paravets and they are poorly trained, remote and their services expensive. Government paravet services are almost non-existent in remote villages, and the very few hospitals/veterinary centres are far from those villages. The required skills for efficient animal husbandry and effective support services for livestock farmers are also missing from remote areas. Smallholders lack access to key services like advice, training and access to quality inputs supporting nutrition, health, breeding, and management. The ratio of veterinarians and paravets to livestock in the state is among the lowest in India, with limited resources and services that mostly focus on cattle and buffaloes. There is an immense opportunity for skill enhancement for farmers and community service providers to deliver effective support services.

E Implementers

While the JOHAR project is legally implemented under the Rural Development Department of the State Government of Jharkhand, the JSLPS is the de facto implementer. It is registered and funded by the Rural Development Department and designated as the special purpose vehicle for project implementation. JSLPS is responsible for the overall outputs and outcomes of the project, sourcing co-financing through convergence and technical support through partnerships. It is also implementing the ongoing National Rural Livelihoods Mission.

The key line implementing departments are listed in Table 5.1. These departments provide technical support through training and extension services as well as finance through convergence with government schemes.

F Partners

Three main partners collaborate in implementing JOHAR. Heifer International and its subsidiary Asset & W both provide training, skills development and capacity building. Heifer International has over 10 years of experience in training community service providers in India. The Agriculture Skills Council of India sets the exams and certification of community service providers.

G Funding

JOHAR is a six-year project ending in 2023, where the World Bank is investing USD 100 million as a loan to the Government of India which has committed USD 43 million. Investment in the livestock component is USD 15.6 million. See the funding flow in Figure 5.1. The important stakeholders involved in the project and their contribution are detailed in Table 5.1.

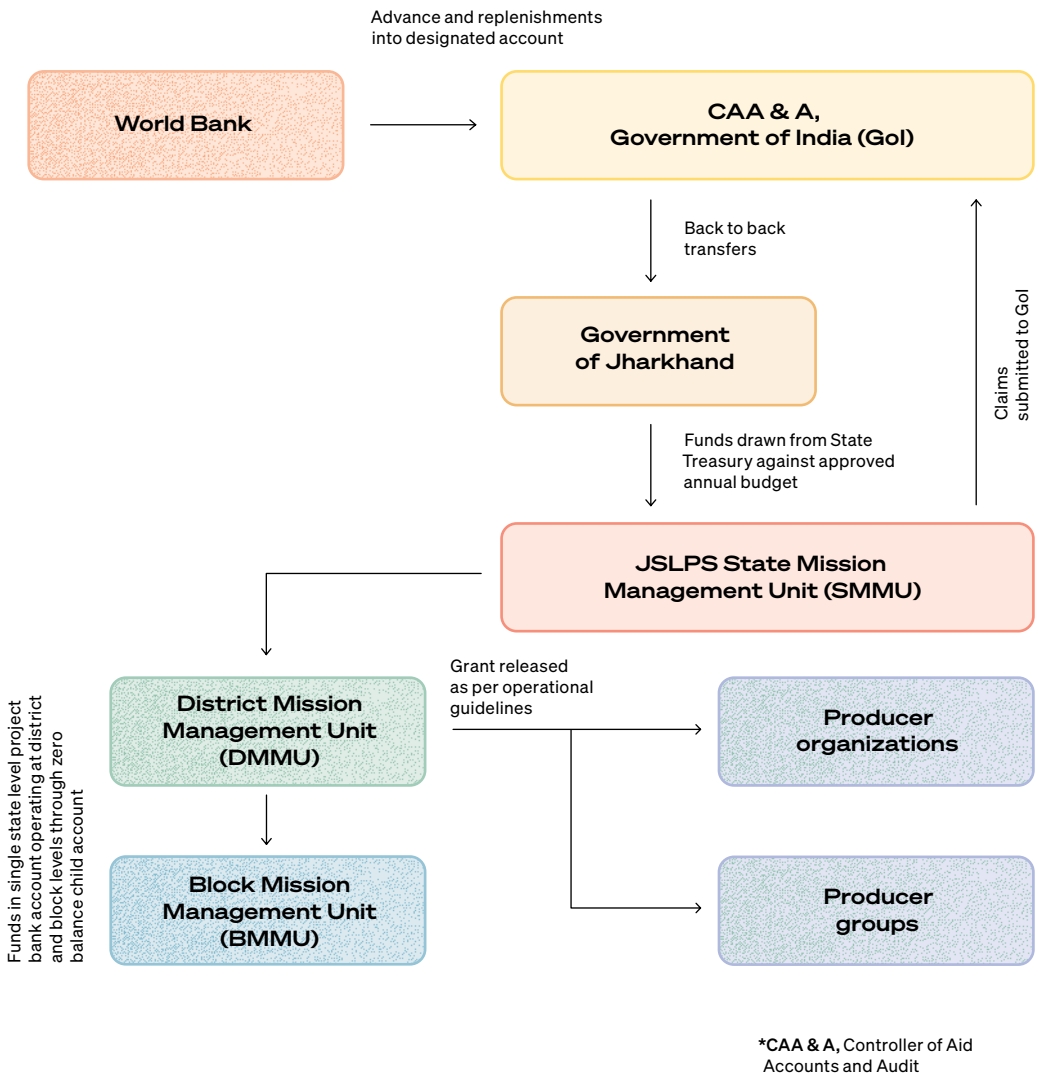


Figure 5.1
Funding flow system of JOHAR

SOURCE: World Bank. 2017. Project appraisal document on a proposed loan in the amount of USD 100 million to the Republic of India for a Jharkhand opportunities for harnessing rural growth (JOHAR) Project. Agriculture Global Practice, South Asia Region Report No: Pad2273. International Bank for Reconstruction and Development.

Table 5.1
Main stakeholders in the JOHAR project

	Stakeholder	Role	Contribution
Community stakeholders	Producer groups (these did not exist before JOHAR, and are described in section M)	Community institutions	Livestock production, practice skills learned, engage services of APS and MTs for enhanced production and income
	Self-help groups	Community institutions	Financial transactions, livelihood plans, support on gender issues
	APS and MTs	Trainee and beneficiary	Provide skills, services and products on farmers' doorsteps
Implementation actors	Rural Development Department of Jharkhand	Implementer (de jure)	Host the project, provide fiduciary support as required
	Jharkhand State Livelihoods Promotion Society	Implementer (de facto)	Implement with the farmer and community groups supported by JSLPS
	Department of Agriculture (encompassing the directorates of horticulture, animal husbandry, fisheries and soil conservation)	Partners for implementation	Technical support through training and extension services as well as financial support through convergence with government schemes
	Department of Environment, Forest, and Climate Change		
	Department of Water Resources		
	Department of Higher and Technical Education		
	Department of Energy		
Partners	Heifer International	Partner	Developing the technical training content and modules for APS and MTs
	Asset & W	Partner for training	Provide technical training to the livestock farmers, APS and MTs
	Agriculture Skills Council of India	Partner for certification	A government accredited training and certification agency Conducts exams and provides certification of APS and MTs as certified paravets
	World Bank	Financier	Financing

SOURCES: Authors' own elaboration.

ASPIRATIONAL BUILDING BLOCK

H Impacts

The JOHAR project aims to enhance and diversify household income through the livestock component by targeting about 57 000 women livestock farmers and APS and MTs. It aims to improve livestock production, productivity and access to markets with its main objective empowerment of women.

I Outcomes: changes in actions and behaviours

The JOHAR project aims to change actions and behaviours among women livestock farmers through improved livestock rearing, reinvestment of incomes into production, price negotiations as well as seeking help and community and market engaging behaviour. The changes sought in actions and behaviours among APS and MTs are to provide paraveterinary services to other farmers, teaching and taking on leadership roles.

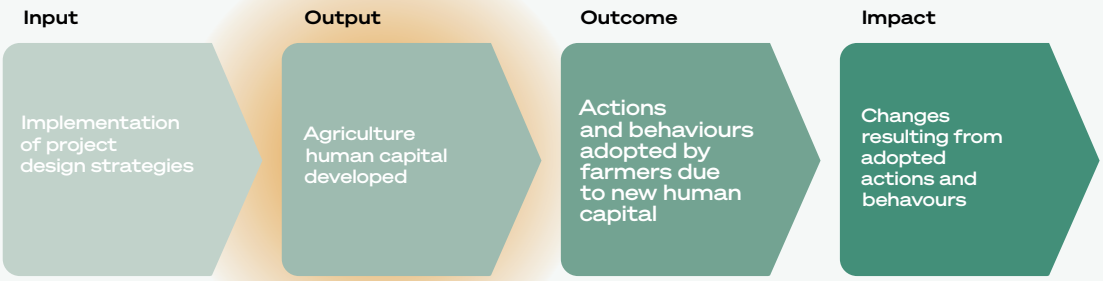
J Outputs: development of human capital

The human capital investments in JOHAR revolve around enhancing the technical, functional, business and managerial capacities of farmers. They learn technical skills such as improved animal care, animal and shed cleanliness, correct use of feed supplements and clean drinking water. They acquire functional skills like the confidence to seek timely veterinary services and first aid for their animals, taking pride in their contribution to family income, leaving home to participate in training sessions, communicating with other people and attending self-help group meetings. They also learn business skills like selling goats based on body weight, investing income from livestock in improved farming, as well as decision-making skills in other areas of investment and sending children to school instead of relying on their help with livestock.

Both the APS and MTs develop technical, functional and business skills. The technical skill focus is on building capabilities as paraveterinary service providers, including skills in deworming, nutrition, teeth conservation, timely castration, animal first aid, basic diagnosis and shed design and construction. Functional skills include: using a computer and digital training content; designing and conducting training sessions; presenting oneself at training sessions; valuing contributions towards the betterment of society; dealing with gender biases in society (e.g. having the courage to leave home for meetings/trainings, talking to people other than family members taking independent decisions); and communication skills. Business skills for APS include developing marketing linkages for livestock, valuation of animals based on body weight, and having a business plan for veterinary services and products. The MTs acquire advanced skills like group facilitation and are teachers for APS and farmers. Both APS and MTs gain skills in how to reinvest in their own businesses as livestock farmers.

MTs have all the skills required by an APS and are also skilled in community facilitation and conflict resolution. As trainers, they have the skills to present themselves at training sessions, prepare the content, deliver the programme and use computers and ICT materials. MTs have the confidence to travel from their villages to different blocks (administrative units) and districts, staying overnight if necessary.

Figure 5.2 gives a broad overview of the connection between the outputs, outcomes and impacts in the JOHAR project. It likewise alludes to the choices of development methods under "Input", described in more detail in the following design building block.



	Implementation actions	Skills developed	What farmers now do	Impacts
LIVESTOCK FARMERS	APS and MTs provide training at structured training events at training centres APS and MTs provide continued extension in farmer field schools in home location Human capital development "add-on" provision of grants to producer groups	Technical agricultural skills • improve animal care • animal and shed cleanliness • feed supplements and clean drinking water Functional skills • seeking timely veterinary services • self-confidence as an income-earner • self-confidence to participate in out-of-home trainings, PG meetings • communication skills Business skills • selling goats based on weight • reinvesting income in production	Farmers with access to APS/MTs services improve their livestock rearing practices Farmers with access to APS/MTs reinvest incomes in their production Farmers negotiate for better market prices, spending whole days outside of houses, talking to new people and traders Help-seeking behaviour	Improvements in livestock production and productivity Increased incomes for farmers and APS and MTs Acceptance and self-confidence, empowerment of women farmers
APS AND MTs	Technical Service Providers provide training for APS and MTs at the Technical Support Agencies Agriculture Skill Council of India provide certification exams of APS and MTs Human capital development "add-on" Establishing Livestock Service Centres (small shops) run by producer groups helps APS and MTs to provide necessary inputs and medicine	Technical agricultural skills (para-vet skills) • deworming • nutrition • teeth clipping • timely castration • animal first aid Functional skills • operating computers and using digital training content • designing and conducting training sessions • presenting during training sessions • valuing their contribution towards betterment of their society • dealing with gender related biases in the society • communication skills • Group facilitation and teaching skills (MTs) Business skills • developing marketing linkages for livestock • valuation of animal based on body weight • having a business plan of their veterinary services and products • networking with other experts in the sector and seek support from them whenever required. • How to reinvest in own businesses as livestock farmers	APS and MTs start providing para-vet services to livestock farmers - also beyond JOHAR APS and MTs take on teaching, networking and leadership roles, conduct training programs, set examples for good rearing practices APS and MTs reinvest in their own businesses APS and MTs search for better jobs due to certification	APS and MTs gain self-confidence and recognition from families and community, acceptance as experts APS and MTs become empowered Improved and supportive community networks Increase in livestock businesses

Figure 5.2
Theory of change in JOHAR

SOURCE: Authors' own elaboration.

DESIGN BUILDING BLOCK

K Targeting women livestock farmers, APS and MTs

As a target group, the 57 000 women are smallholder/livestock farmers with land holdings from 0.1 ha to 1.2 ha and all members of self-help groups. They are between 20–53 years of age, have education levels ranging from no schooling to graduates and are willing to invest in improving animal rearing practices. They are traditional animal farmers with livestock consisting of a few goats, cattle, pigs, hens and ducks.

From the 57 000 female livestock farmers, each village selects APS based on eligibility criteria that include: (i) a minimum of nine years schooling; (ii) belonging to the same village; (iii) membership of a local producer group; (iv) being a livestock farmer with at least two animals; (v) willing to travel for training and exposure visits; and (vi) actively looking for increased cash income.

MTs are all previous APS selected for further training according to the following criteria: (i) proven training skills based on earlier experience in farmer training; (ii) hands-on experience with livestock; (iii) female between 30–45 years of age; (iv) education level of at least 10 years schooling; and (v) ability to travel to various parts of the state.

MTs are all women in the 28–34-year-old group, all are smallholder farmers, holding around 1.5 acres of land and having 10–15 years of formal education.

A few male livestock farmers are involved in the JOHAR project, however 95 percent of trained ASP and thereby MTs are female.

L Method

The method of agriculture human capital development in the JOHAR project has two distinct components according to who the primary learner is: (i) how the APS and the MTs acquire their skills and capabilities; and (ii) how other livestock farmers do so. See Figure 5.2.

How APS and MTs develop their agriculture human capital

To become an APS, MTs train the women in groups of 15–20. Each APS receives 30 days training over 18 months in five sessions of 4–7 days each. After completing the third training session and six months' experience, the APS is eligible to take the certification examination with further preparation from the Agriculture Skills Council of India over seven days. Certification offers many benefits, it professionalizes the APS and helps standardize their quality across the country. The cost of training an APS includes that for training an MT in trainer-of-trainer mode and is INR 75 000 (USD 975). This includes accommodation, travel expenses and all associated costs such as the services of Asset & W in preparing materials, training MTs and coaching support for APS. MTs are responsible for training the APS such as preparing the venue, planning the 6–7 days, deciding training content, sub-group activities, setting tests during training, feedback forms, field assignments, logistics and handling the participants' urgent needs.

MTs obtain additional certification, giving the added benefit that they are recognized as the most professional trainers and can work anywhere in India. To learn community facilitation skills and conflict resolution, they undergo ten days special training with Asset & W.

Both APS and MTs are trained at Technical Support Agencies, where technical service providers, generally staffed by Asset & W, oversee teaching and capacity building. Heifer International and Asset & W provide training materials and training for MTs, APS and livestock farmers, capacity building and technical advisory support in raising goats, pigs and backyard poultry. Asset & W employ technical service providers, who select and offer training to APS and MTs as well as input delivery and APS demonstrations.

How livestock farmers develop their agriculture human capital

The rest of livestock farmers are trained by the APS in training centres within the State Rural Institute for Training. Back home, the farmer field school approach is adopted to educate livestock farmers where the APS facilitates the field schools and arranges regular get-togethers at different farms, where farmers meet to learn skills ("learn to do by doing") covering the areas of animal care and improved practices. Thereafter the APS supports farmers with ongoing services and inputs. Since the APS is a part of the livestock farming community, she can readily follow up with farmers to remind them of the new skills and lessons learned. Farmer training to develop and help them adopt new skills is a long-term activity. The farmer field school approach supported by APS has led to high acceptance rates of new efficiency and marketing practices.

This method of certified community promoters ensures services at farmers' doorsteps for animal vaccination, castration, teeth maintenance, deworming, basic diagnosis, first aid, and advising the farmer about animal cleanliness, clean drinking water, feed supplements, shed design and construction, The aim is to motivate farmers to adopt improved animal rearing practices and deal with gender related social and cultural stresses. Whenever farmers have a particular need about a specific issue, APS seek support from MTs and veterinarians. They also help develop market linkages and the estimated sale value of animals and advise farmers accordingly.

As a part of JOHAR, many livestock farmers organize into producer groups which benefit from the training and services provided by the APS and MTs. They develop skills and expertise within producer groups, hence they have a big contribution to make in capacity development. Producer group meetings held by the APS and MTs are learning events where participants can share experiences. These are the main community institutions with which JOHAR works and most are not exclusive to women. The skills development specific to producer group meetings are added agriculture value, diversification, intensification, competitive advantage, easier access to finance, entrepreneurship and agribusiness skills.

Both APS and MTs have a business plan around the services and inputs they provide. MTs are paid based on their training work, INR 750 per training day (USD 10). They also provide medicines/feed supplements to farmers at a cost. Both APS and MTs are paid partly by livestock farmers for their services and the inputs or products they deliver and partly from the JOHAR project. It is expected when the project is over, they will maintain their income with payments from farmers for their services and products.

Fundamental to the human capital development supported by APS and MTs is providing equipment including a smartphone and a kit containing a blue sari, apron, hat, cool box for medicines, weighing scales, castrator, and a basic initial stock of first aid supplies. Ayurvedic treatments are provided when available. Equipping each APS costs INR 5000 (USD 65) for the kit and another INR 5000–7000 (USD 65–91) for a smartphone, totalling about INR 12 000 (USD 156). After the first inventory of supplies is complete, the APS uses her income to maintain her supplies which she purchases from the Livestock Service Centre.

In addition to human capital development JOHAR's work with producer groups involves providing grants. The JOHAR livestock development activities are as follows:

1. provision of sub-grants to producer groups to procure improved stock for pig and goat breeding;
2. provision of sub-grants to producer groups for demonstration units on livestock housing and improved breeds;
3. provision of sub-grants to producer groups to finance input and service costs of livestock rearing;
4. helping establish livestock service centres, product outlets for the producer groups with access to inputs, services and markets through aggregation. These centres are part of the producer organization;
5. capacity building and technical support on productivity enhancement and marketing; continued extension support is provided to producers through APS;
6. partnerships with technical support agencies to provide end-to-end solutions, capacity building and technical support and with private sector agencies to supply quality inputs; support through convergence with Government of Jharkhand programmes is likely for several activities in this sub-component including livestock housing, introduction of improved animal breeds, and establishment of feed plants.

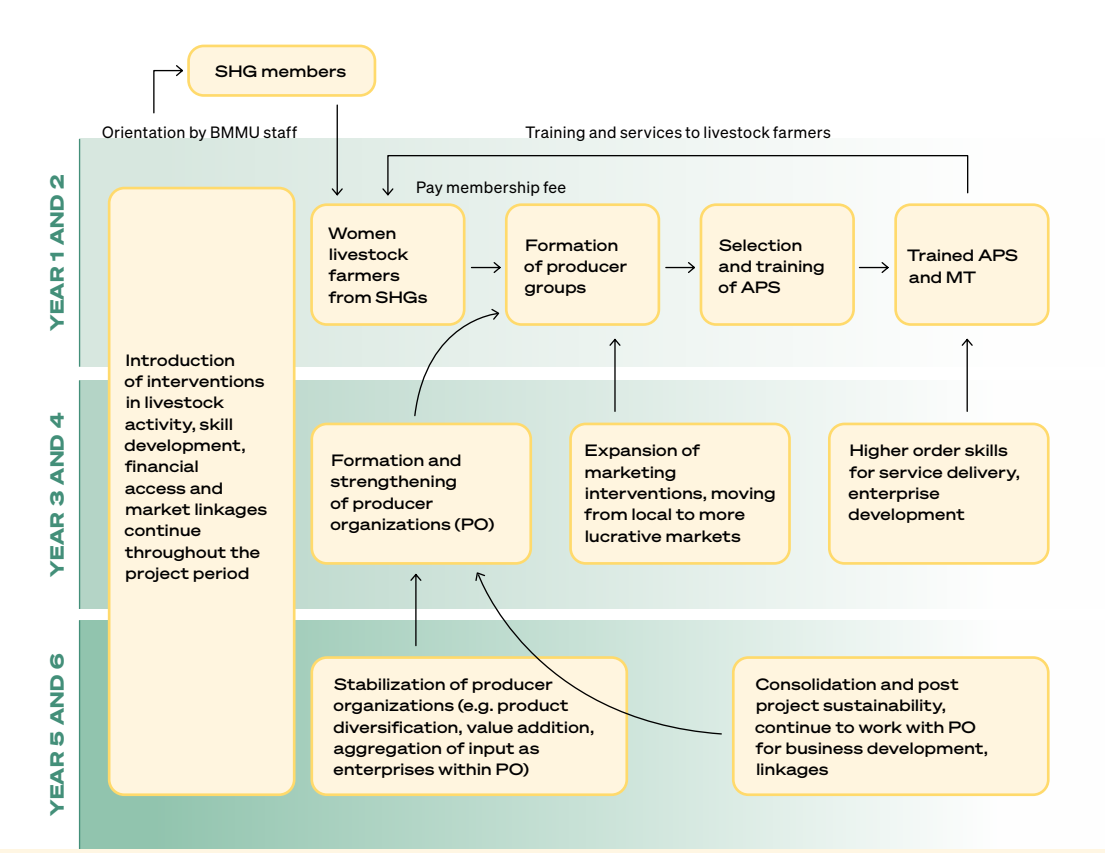


Figure 5.3
Layering and phasing of JOHAR project activities

SOURCE: Authors' own elaboration.

M Organizing

The project implementation architecture of JSLPS is spread over various levels (Figure 5.3).

State level

A High-Level Steering Committee steers the project, headed by the Chief Secretary of Jharkhand State, co-chaired by the Development Commissioner, and comprising the Principal Secretaries of the relevant departments (Rural Development, Agriculture, Environment, Forest and Climate Change, Water Resources, Energy and Higher and Technical Education). A State Mission Management Unit (SMMU) for JOHAR, headed by the Chief Executive Officer of JSLPS, has a multi-disciplinary team of staff and technical consultants working exclusively for JOHAR.

District level

There is a District Mission Management Unit (DMMU) for JOHAR in each of the 17 districts. It is staffed by a multi-disciplinary team of technical consultants whose expertise focuses on the specific sub-sectors in the district and includes experts in high-value agriculture, irrigation, livestock, fisheries and non-timber forest products.

Block level

Each of the 68 blocks (administrative units of state governments) has a dedicated JOHAR Block Coordinator reporting to the Block Project Manager of JSLPS in the Block Mission Management Unit (BMMU). Three cluster-level field coordinators provide technical support and coordination services to ensure smooth implementation, working closely with APS at village level and senior APS at cluster level. The APS in turn are responsible for the formation and functioning of producer groups and provide the last mile link delivering project services like advice, paravet services and inputs like medicines and nutrient supplements to producer groups.

Village level

JOHAR works with and supports community institutions of self-help groups and village organizations and cluster level federations with training in livestock rearing. Small producers are aggregated around key subsectors to form producer groups and larger producer organizations such as companies and cooperatives. Farmer field schools are formed once APS are selected and trained.

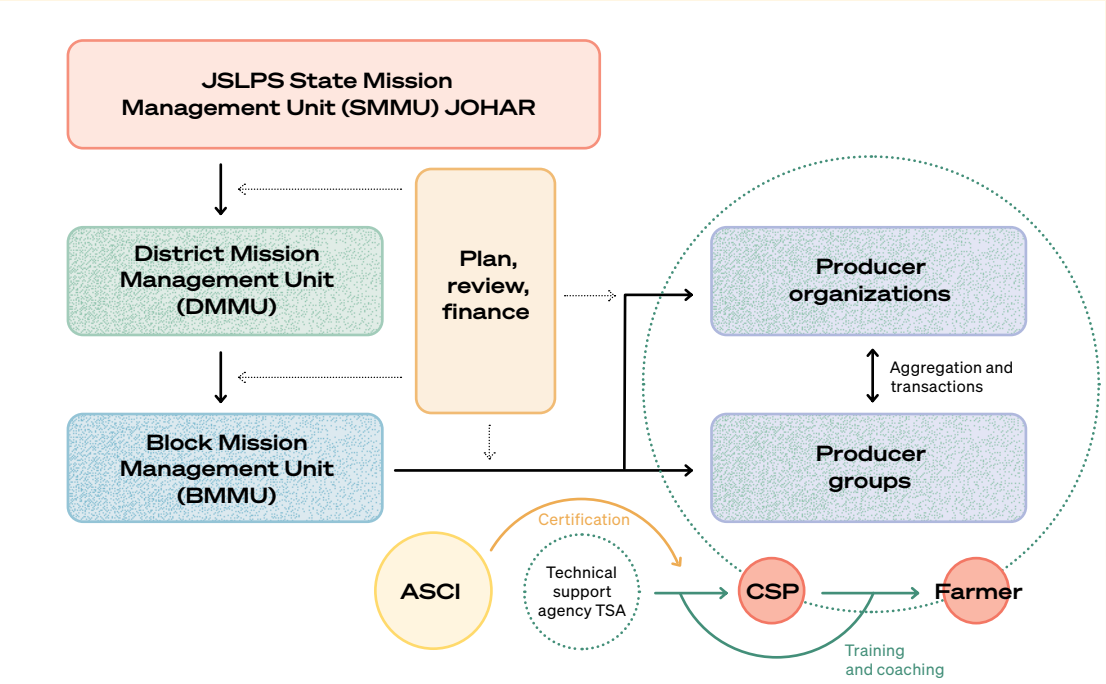


Figure 5.4
Implementation structure of JOHAR

SOURCE: Authors' own elaboration.

N Scaling and sustaining

There are ongoing efforts to scale up this model in India, together with the Ministry of Rural Development. This is an opportunity to share detailed concepts and learning notes with the Ministry to build bridges with national programmes such as the National Rural Livelihoods Mission (NRLM). JSLPS can scale up the project in Jharkhand since it already has a large livestock-based livelihoods programme in place. As JOHAR is a small project implemented under the NRLM, the learning from it can be shared with other places through NRLM systems, provided it is fully informed about JOHAR.

The project interventions build on the existing social capital of women's self-help groups and their federations, and through them develop local producer groups and higher order producer organizations (collections of producer groups) to facilitate collective production, increase bargaining power and employ economies of scale. The producer organizations function as entities that will continue to operate through business activities supported by linkages to formal financial institutions like banks and microfinance institutions. The project design emphasizes building community capacity through local APS and MTs who will be paid based for their services and thus are primed to work with producer organizations as business associates. The project builds sustainability of production systems through investments in community capacity as well as infrastructure for diversification, productivity enhancement, climate resilience and market responsiveness. More information is needed on the financial viability of the existing APS model since the project is ongoing and may need some time to make them financially stable.

There are opportunities for scaling up the APS model beyond the State of Jharkhand. It can be replicated in regions with livestock farmers where educated women are willing to be trained and provide veterinary services to livestock farmers. In implementing similar initiatives, there is a need for structured investment and capacity enhancement for the women community service providers.

O Keep improving: monitoring and reviewing

Institutional support, monitoring and review system

The project and local veterinarians provide emergency back up support, for animal injuries or complicated births through smartphones and WhatsApp. It enables vets to focus on cases they are best trained to handle.

Farmer producer groups monitor the APS delivery of services and inputs through broad criteria such as the number of farmers trained and the number of animals marketed or vaccinated. An app can support service delivery as well as monitoring and evaluation.

LESSONS LEARNED AND EVIDENCE OF IMPACTS

At the centre of the intervention are women livestock farmers, who were strategically identified, trained, and coached as APS under JOHAR to provide doorstep technical, marketing and risk reduction support to other women livestock farmers.

Certified MTs support the APS a model that is almost unique, offering evidence of capacity enhancement in the form of changed practices by livestock farmers (Kumar *et al.*, 2021). The improved practice changes included timely vaccinations, deworming, castration, animal cleanliness and provision of feed supplements and clean drinking water for livestock. These changes increased income significantly and enhanced animal survival rates. They also reduced production time, recognized the role of women in families and their communities, offered a supportive network to livestock service providers, increased investments in businesses, education of children and confident APS and livestock farmers. The model enhanced the economic and social well-being of poor rural women working as livestock farmers and APS.

Since human and animal health are now seen as a continuum, there is need for strategic interventions and collaboration with ministries responsible for animal and human health. Animal husbandry departments should support disease diagnosis, since it is a public good and requires considerable investment. APS can supplement animal husbandry departments by supporting livestock farmers.

The work of APS under the JOHAR project shows that it is possible to enhance human capacities in agriculture, even among the poorest, most marginalized groups, such as women and Indigenous Peoples who raise livestock on very small farms in remote villages. This was made possible by:

1. training local people only as APS;
2. direct involvement in all activities, as APS are also livestock farmers belonging to producer groups so there is peer pressure to maintain support;
3. structured training and coaching by one of the best firms in the business e.g. Asset & W;
4. effectiveness of training evaluated by an independent appraising agency such as the Agriculture Skills Council of India;
5. technical training in functional skills and values;
6. opportunities for progression from APS to MT;
7. supplementary income and earnings from services rendered;
8. opportunities to work anywhere as a certified APS or MTs;
9. development of a supporting network with MTs and external experts;
10. ongoing support through regular reviews and producer group meetings;
11. structured intervention along the entire value chain from shed construction, veterinary services, feed supplements to marketing;
12. potential for APS and MT interventions to apply their skills for their own well-being and that of livestock farmers in their village.

Case study 2

The Haku Wiñay/Noa Jayatai

BRIEF PROJECT DESCRIPTION

The Government of Peru has run the Haku Wiñay/Noa Jayatai programme since 2014. Built upon lessons from previous programmes and funded by the government and international cooperation (FAO, IFAD), it comprises a set of interventions combining social protection with agricultural development. By the end of 2020, Haku Wiñay/Noa Jayatai covered 140 000 households in the subsistence economy, while more than 130 000 have completed the three-year cycle, covering more than 270 000 households between 2014 and 2020.

The programme is implemented by the Cooperation Fund for Social Development (FONCODES) of the Ministry of Development and Social Inclusion and is a results-oriented budget programme, meaning the Ministry of Economics and Finance is directly involved in design, monitoring and budget allocation to ensure good value for public expenditure. Haku Wiñay/Noa Jayatai has four components:

Component 1 – Improved agricultural systems

Technical assistance to implement simple, low-cost technology innovations

Component 2 – Healthy housing

Technical assistance for household innovations, such as safe cooking stoves, water and solid waste management, vegetable gardens, and barns for small animals

Component 3 – Improved financial capacity

Technical assistance to develop savings plans and basic accounting skills

Component 4 – Inclusive rural business

Technical assistance to organize business associations, prepare business plans and apply for grants by participating in government competitive funding programmes

The first two components take place during the first two years of the programme and the last two in year three. After the three-year cycle is complete, the programme finishes in that community.

The following subsections provide further insights about contextual factors (framing building blocks), programme purpose (aspirational building blocks) and programme design (design building blocks).

FRAMING BUILDING BLOCK

A Farmers

Family farming in Peru covers more than 95 percent of farms, or about 2.1 million families and employs more than 3 million people. Most family farms, about 1.9 million, are in the subsistence economy, which means most are smallholders, have limited access to markets and are chronically poor. Haku Wiñay/Noa Jayatai focuses on improving the human capital of family farms and rural households in the subsistence economy. The programme defines them as households which derive more than 75 percent of their income from agriculture, have less than 1.3 hectares, less than 10 percent of their production is sold in markets and more than 75 percent of their labour is devoted to agriculture. Around 65 percent of rural households meet these four criteria, about 1.3 million households, including Indigenous People from the Highlands and Amazon regions.

The target population has limited access to extension services: only 3 percent of subsistence farmers used extension services in 2012.3 They have limited access to irrigation (0 percent), certified seeds (0 percent), fertilizers (30 percent), land titles (29 percent) and credit (4 percent). Only 21 percent consider they have sufficient income to meet basic household needs.

B Institutions

Haku Wiñay/Noa Jayatai contributes to the implementation of Pillar 4 of the National Policy for Development and Social Inclusion, which refers to economic inclusion.

E Implementer

Fully implemented by FONCODES, the programme design allows for co-implementation by other institutions, such as municipalities, governmental programmes and the private sector. Although FONCODES provides institutional support and financing the programme is implemented through community projects managed by the community (see Design building blocks).

F Partner

The main partners of FONCODES are local municipalities. They do not make any intervention and rarely allocate funds to the programme, but are involved in selecting villages and the design of community projects and choose one member of the Community Implementation Committee Board, (see Design building blocks).

G Financing

The Peruvian Government funds the programme fully. The total budget allocation between 2014 and 2022 was USD 490 099 461, with an average annual spend of USD 54 455 496 (constant 2015). Average expenditure per household between 2014 and 2020 was USD 1410 during which the programme covered about 270 000 households.

The programme gathers information for the framing building blocks from several sources: at district level, using secondary data such as the census of agriculture, population census or district-level records from the Ministry of Agriculture and Regional Agricultural Statistics Offices. Village information is gathered through the participatory diagnostic, part of the design phase of the community project.

Input	Output	Outcome	Impact
Implementation of project design strategies	Agriculture human capital developed	Actions and behaviours adopted by farmers due to new humancapital	Changes resulting from adopted actions and behavours

	Implementation actions	Skills developed	What farmers now do	Impacts
COMPONENT 1 IMPROVED AGRICULTURAL SYSTEMS	Yachachiqs* provide agriculture technical assistance + training on: • Irrigation systems (sprinkler, drip) • Water harvesting • Permanent and seasonal crops • Vegetable gardens and greenhouses • Pastures • Animal husbandry • Agroforestry • Organic fertilizers • Aquiculture • Conservation of native varieties Human capital development "add-on" investments in agricultural infrastructure, e.g., small irrigation systems, low cost greenhouses	Technical agricultural skills • Install and maintain irrigation systems (sprinkler, drip) • Harvest water • Install and maintain permanent and seasonal crops • Install vegetable gardens and greenhouses • Manage pastures • Raise small animals • Install agroforestry systems • Produce organic fertilizers • Develop aquiculture • Conserve of native varieties	Adoption of improved practices of • Irrigation systems (sprinkler, drip) • Water harvesting • Permanent and seasonal crops • Vegetable gardens and greenhouses • Pastures • Animal husbandry • Agroforestry • Organic fertilizers • Aquiculture • Conservation of native varieties	Increased crop productivity
COMPONENT 2 HEALTHY HOUSING	Yachachiqs provide training in healthy housing: • Nutrition • Stove making • Health practices, e.g., hand washing • Water safety • Solid waste management • Time management Human capital development "add-on" investments in agricultural infrastructure, e.g., small irrigation systems, low cost greenhouses	"Livelihood skills" on how to • Prepare healthy diets • Install and use improved stoves • Undertake healthy practices • Improve home's organization • Secure safe water • Manage solid waste • Organize household activities to save time	Adoption of healthy housing management • Cook more healthy diets • Build and use improved stoves • Undertake health practices • Securing safe water • Manages solid waste • Allocate and organize their time more efficiently	Improved health of family members Improved agricultural performance (due to better health) Households have more time Improved well-being
COMPONENT 3 IMPROVED FINANCIAL CAPACITY	Financial Yachachiqs provide financial education according the the Financial Education Plan	Business and household financial skills • Basic accounting skills • Knowledge of how to make savings plans	Adoption of record-keeping Better financial management Farmers start up savings	Improve agricultural performance (due to better management) Improve household resources' management
COMPONENT 4 INCLUSIVE RURAL BUSINESS	Local marketing advisors provide business training to sub-target group (those who apply for funding for their business plan) Human capital development "add-on" access to funding	Business development skills on • Where and how to apply for funding • How to form and organize businesses (3–4 ppl.) • How to prepare business plans • How to brand products • Packaging • How to ensure food safety • Other crafts for sale Mindset Openness to undertake production as a business	Adoption of record-keeping Better financial management Farmers start up savings	Improve agricultural performance (due to better management) Improve household resources' management

*Yachachiqs = local promoters

Impacts from all 4 inputs

Farmers gain access to local markets	Women empowerment as all four inputs target women	A newly developed local market in agricultural extension services (Yachachiqs)	BONUS: Social capital development ECE gained management skills of how to implement a project, how to look for funding, who to hire, from the project implementation itself, not from an input

Figure 5.5
Summary of aspirational building blocks of Haku Winay/Noa Jayatai

SOURCE: Authors' own elaboration.

H Impacts

Haku Wiñay/Noa Jayatai's theory of change seeks to address the challenges faced by the target population. The main problem is "rural households in a subsistence economy with limited access to markets", based on the current status of family farms gathered while developing the Framing building blocks. The programme document includes a problem tree with the direct and indirect causes supported by the best available evidence. These are as follows.

Direct cause 1: Decapitalization of assets

- unsustainable natural resources management;
- limited access and low quality of assets;
- low asset management and preservation capacities;
- limited access to financial assets.

Direct cause 2: Weak capacities to develop productive activities

- low organizational capacities to manage resources;
- low technology management capacities to guarantee production quality;
- limited access to technical assistance;
- low capacities to access financial assets and improve production.

Direct cause 3: High transaction costs to access markets

- high transport costs;
- limited road infrastructure;
- limited telecommunications infrastructure;
- limited access to market information.

Based on the identified main problem, the final impact of the theory of change from the programme is: "Rural households in a subsistence economy with opportunities to access local markets". This is achieved through the following results from the programme:

- increased crop productivity;
- improved linkages with agricultural value chains.

In addition, several studies report additional impacts not originally identified in the programme's theory of change:

- improved health of family members;
- improved agricultural performance due to better health;
- women's empowerment;
- improved well-being;
- development of market for agricultural extension services;
- community managerial skills development.

I Outcomes

The programme seeks to achieve these impacts by transforming the agricultural system of family farms in a subsistence economy. As farmers adopt the innovations and technologies promoted by the programme, this leads to changes not only in agricultural production but also in household and business management. Farmers are adopting technologies and innovations in the following topics.

Improved farming production systems:

- irrigation systems (sprinkler, drip);
- water harvesting;
- permanent and seasonal crops;
- vegetable gardens and greenhouses;
- pastures;
- animal husbandry;
- agroforestry;
- organic fertilizers;
- aquaculture;
- conservation of native varieties.

Developed and maintained healthy housing:

- healthy diets;
- improved stoves;
- healthy practices;
- home organization;
- safe water;
- solid waste management.

Greater financial capacity:

- adoption of record keeping;
- improve financial management;
- savings;

Promotion of inclusive rural businesses:

- organization for business development;
- preparing business plans;
- pursuing grants by participating in governmental funding programmes;
- developing “business behaviour”.

J Outputs

The outputs of the programme refer to the development of a set of skills in the fields mentioned above, summarized as follows.

Output 1: Technical agricultural skills:

- how to install irrigation systems (sprinkler, drip);
- how to harvest water;
- how to install and maintain permanent and seasonal crops;
- how to install vegetable gardens and greenhouses;
- how to manage pastures;

- how to raise small animals;
- how to install and maintain agroforestry systems;
- how to produce organic fertilizers;
- how to develop aquaculture;
- how to conserve native varieties.

Output 2: Livelihood skills:

- how to devise healthy diets;
- how to install and use improved stoves;
- how to undertake healthy practices;
- how to improve home organization;
- how to source safe water;
- how to manage solid waste;
- how to organize household activities to save time.

Output 3: Business and household financial skills:

- how to keep records;
- how to manage financial resources;
- how to save.

Output 4: Business development skills:

- where and how to apply for funding;
- how to prepare business plans;
- how to brand products;
- how to use packaging;
- how to ensure food safety;
- how to develop other crafts for sale.

Note the different fields of human capital developed and described here differ slightly from the three field categories in Module 3. This is due to the more holistic approach of the Haku Wi/Noa Jayatai project and the inclusion of human capital beyond agriculture such as livelihood and household skills.

DESIGN BUILDING BLOCK

K Targeting

The selection of the programme participants is based on three steps.

1. Villages are invited to participate in the programme based on the following three criteria:

   - towns and villages in districts with more than 40 percent monetary poverty rate, based on the District Poverty Map of 2013;
   - towns and villages within agricultural registration areas from the 2012 Agricultural Census with an average land possession of 1.3 ha; and
   - towns and villages comprising Indigenous Peoples.

These criteria yielded 11 191 towns and villages with 533 962 households considered eligible for the programme. This number covers about 40 percent of subsistence economy households.

2. FONCODES decides which villages will participate each year based on the budget allocated to each region, synergies between villages selected in previous years and potential new villages, and dialogue with municipalities and other local actors, mostly NGOs.

3. At household level, the Community Implementation Committee (CIC) selects the households for a given year with the participation of a community assembly, based on the participatory diagnostic (explained below).

The programme runs nationwide, but most households are in the highlands and the Amazon Region. While the programme does not target women and youth directly it recognizes this limitation and is implementing ad hoc targeting strategies to increase their participation.

M Organization for delivery

Community participation

In making a selection FONCODES teams visit the villages, meeting community leaders and the mayor of the district to guarantee the community approves their participation. If all are in favour, an agreement is signed between FONCODES, the community and the municipality.

Community Implementation Committee

The CIC in selected villages develops programme activities through projects designed with the participation of the community. Each CIC works with approximately 100 households and is managed by community members under the supervision of FONCODES. A CIC board comprises a President, Treasurer and a Secretary as well as a member designated by the local municipality. Once the board is up and running and the Operations Manual written, the CIC must be registered on the National Registration System, which means it has legal responsibility for the funds it receives. The CIC then appoints a manager, who leads all the activities performed in the community.

CIC board members receive training by FONCODES staff in accounting and management. Since they have legal responsibility for how the funds are used, they must be aware of and understand the procurement process.

Participatory diagnostic

The first CIC activity is the participatory diagnostic of the community, to identify major problems faced by the community regarding agriculture and access to markets. All community members participate and provide information about their situation.

Community project design

The information is used to design community-specific projects and implement Components 1 and 2. The CIC manager leads the design of the project rooted in community needs and a "menu" of pre-selected possible activities, based on the skills the project aims to develop (see Outcomes at the "Aspirational building blocks"). CIC members must approve the project and the project document which outlines the activities to be performed and the funding required from FONCODES. Community projects are implemented during the first two years of intervention.

Yachachiq

Following a selection process, the CIC hires *Yachachiq* as local promoters to implement community projects. They have direct contact with programme participants and provide all the technical assistance and training to improve agricultural productive and household management skills. *Yachachiq* receive training from FONCODES technicians, come from the same or surrounding communities and speak the same language. The average monthly salary of a *Yachachiq* is USD 428 plus transport and a per diem when they travel to other villages.

Yachachiq are the basis of the programme organization. They need to build trust among programme participants, not always an easy task. They must constantly prove the techniques that farmers will learn are effective and easy to implement. Also, household management skill development is fundamental, especially the installation of improved cook stoves, a key icebreaker.

Financial education

Component 3 is implemented with all adult community members. The CIC approves a financial education plan that considers advice and training on savings, funding, accountability and asset management. It hires a financial yachachiq who is trained by FONCODES staff. These activities take place during the third year of the programme.

Inclusive rural business plans

Component 4 is implemented through business plans selected by community members via a public contest and funded from programme resources. The CIC hires a local marketing adviser with funding from the programme. The adviser leads the design of the business plans, providing technical assistance to those community members (self-organized in small groups) who participate

in this process. Potential businesses are not exclusively agricultural although most are. Others include small animal husbandry (usually guinea pigs or cuy) and many relate to handcrafts, clothes, bakeries, restaurants, tourism and even hairdressing.

Local Committee of Resources Allocation

All groups that receive technical assistance and designed business plans can participate in an all-day public contest to select one business which will receive start-up funding. The selection committee, the Local Committee of Resources Allocation (CLAR), is composed of staff from FONCODES, the local municipality and community members.

Business development

Winning groups receive funding to start their business. The average grant received by each group between 2015 and 2019 was USD 3216 which covered about 65 percent of the cost of the business plan. Entrepreneurs receive technical assistance and training in accountancy and finances, management, branding, food safety and other aspects of business-. Technical assistance and training are provided during the last year of the intervention. Once training is finished and the business is up and running, the programme moves on from the community.

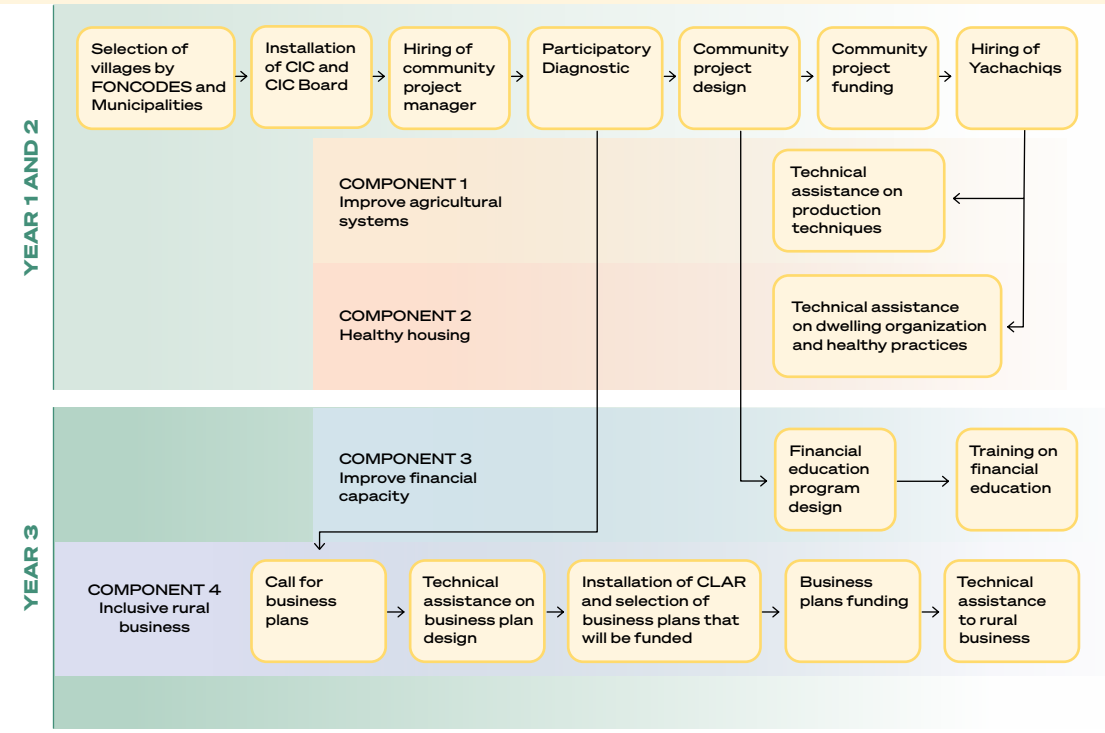


Figure 5.6
Summary of components and processes developed by Haku Wiñay/Noa Jayatai

SOURCE: Authors' own elaboration.

L Method

Yachachiq provide technical assistance, advice and training in Haku Wiñay/Noa Jayatai through informal meetings, workshops and one-to-one training sessions. It is considered a farmer-to-farmer learning by doing method, given that *Yachachiq* meet with farmers and together apply the techniques to be learned. They also use written and visual materials to communicate basic concepts and key messages, but sessions are mostly hands-on. After the group sessions, *Yachachiq* visit each household during the following days to provide technical advice not only on agricultural techniques, but on household management and organization. Each *Yachachiq* works with 35 households on average.

It is worth noting that investment in human capital in Haku Wiñay/Noa Jayatai is provided along with physical capital, such as small agricultural infrastructure and dwelling improvements. *Yachachiq* are crucial to identify the specific farm and household needs, not just skills but also physical needs.

N Scaling and sustaining

The programme has already covered almost half of the target population, with about 35 000 new households each year. Its success relies on the effectiveness of CIC and community project managers to develop procurement processes. The design of Haku Wiñay/Noa Jayatai gives the programme a significant amount of flexibility so as to adapt to each territory. Although Yachachiq need to address community needs, there is no fixed study plan, in the sense that they can adapt training sessions based on local needs, given their previous work with participating farmers.

Regarding sustainability, the intention was to run the programme along with Juntos, a cash transfer programme. If they had run together, households could have invested their monthly payment from Juntos (USD 30 per month) in farm improvements and technology adoption. This did not happen and it is rare for households to participate in both programmes.

O Keep improving

The programme records all the information on tasks and activities, as well as disbursements and budget spending with great detail on participating households and their members. Nevertheless, it does not assess farmers' performance after the programme ends. After year three no follow-up information is recorded nor provided by community members. External agencies have filed assessment and impact evaluation reports, showing improvements with respect to the baseline or in comparison to the control group vis-a-vis the treatment group for experimental studies.

With respect to planned improvements, the programme is considering investing in natural capital, such as reforestation to conserve water or reduce hillside erosion.

LESSONS LEARNED

Based on the impact evaluation studies and assessment reports, the programme shows positive impacts on farm households' well-being through several mechanisms, with improvements in agricultural human capital the major drivers of change. Higher agricultural sales are one of the major impacts reported, achieved mainly because of the training and technical assistance of Yachachiq. However, interventions in business development do not show significant positive impacts. Possible reasons are that community members do not welcome the formation of business development groups. Some studies have shown that community members forming a group to develop a business plan believed erroneously they could split any funding received between them with each using their share separately. This is not allowed. Other studies suggest that one year may be too short for business development.

While the programme indicates success in the highlands, results in the Amazon Region are mixed. It appears the organization of the programme is not suitable for the idiosyncrasies and difficulties of the Amazon, such as limited access and connectivity, resulting in higher implementation costs. Adapting the programme to Amazon conditions requires further analysis.

Community approval of projects is key. From the start of the three-year intervention, the community not only makes decisions on how to use resources but also decides what will be developed and who benefits. This feature ensures there is community empowerment and transparency in the processes adopted.

©Unsplash/Evgeny Nelmin ©Unsplash/Drew Masmar

Module 6
Appraising agriculture human capital investments in the context of economic and financial analysis

Learning objective

To be able to understand and use EFA in AHCI related programmes and projects.

Sound economic and financial analysis (EFA) during project design, appraisal and implementation plays a key role in achieving the desired economic outcomes and increasing the likelihood of sustained economic benefits from a project. The main goal of financial analysis (FA) is to examine the financial returns to project participants (beneficiaries, project entity, institutions and governments) to ensure all actors have enough financial incentive to participate. Economic analysis (EA) on the other hand assesses the project's efficiency in terms of its net contribution to national economic and social welfare. The subtle, yet important differences between FA and EA are discussed in Box 6.1. Box 6.2 provides an example of EFA.

BOX 6.1

DIFFERENCES BETWEEN FINANCIAL AND ECONOMIC PARTS OF THE EFA IN INVESTMENT PROJECTS

Financial part of the EFA

A key objective of FA is to determine the viability of the proposed investment throughout its entire life, based on a particular analytical timeframe. This is usually the first part of the EFA, and thus all concepts and data must be in order and consistent. Normally an inflow and outflow profile over a minimum of ten years. It aims to understand the distributional impacts of the proposed investment.

Economic part of the EFA

The economic analysis focuses on impacts of the proposed investment on the economy and society. It aggregates costs and benefits to the national economy to determine the level of improved well-being after the investment is made. EA is grounded in information developed from financial cash flows, but takes them a step further and adds the principles developed in applied welfare economics. If the gains outweigh the costs, the investment is considered economically viable and justifiable.

SOURCE: Authors' own elaboration.

EFAs are typically a requirement of most project investors. They provide the grounds for making decisions on investment financing for any project based on its financial and economic viability. The FAO Investment Centre and international financing institutions have developed several tools to aid in developing EFAs (FAO, 2022a).

EFAs are challenging to undertake for "soft" investments such as human and social capital programmes and projects. First, some costs may be difficult to identify while second, the benefits may be even more difficult to measure. Monetary costs come directly from input or training costs, which are very tangible. Other costs can be estimated, for example, time devoted by farmers to training. But monetary benefits could come from changes in direct income from agricultural sales. Other benefits may be difficult but not impossible to estimate. Attributing certain changes, such as productivity, income, and empowerment to the project or programme interventions will be challenging. Nonetheless, there are numerous examples of the use of EFAs and impact evaluations with AHCI related projects. Seminal studies and meta-analyses of extension, research and innovation investment projects have pointed to high rates of return, using net present value and internal rates of return calculations (McNamara, 2020).

BOX 6.2

PERU'S AGRICULTURE INNOVATION PROJECT AND AHCI EFA

Between 2015 and 2021 the Peruvian Government partnered with the World Bank and others to implement a National Agriculture Innovation System Support Programme valued at USD 129.95 million (World Bank: USD 40 million, Government of Peru: USD 56.95 million, beneficiaries: USD 30.75 million). This project is emblematic of AHCI. The Ministry of Agricultural Development and Irrigation (MIDAGRI) and its agriculture research arm, the National Institute of Agriculture Innovation (INIA), were the main implementers. The FAO Investment Centre provided technical assistance in project design, supervision and evaluation. An innovative ex-post EFA analysis captured the full array of costs and benefits for this project. It also documented the challenges of identifying different technology adoption rates with their associated streams of benefits and costs. More details are in Annex A and the cited document.

SOURCE: World Bank. 2021. *Fuelling an engine of sustainable growth: agricultural innovation in Peru*. Results Briefs. www.worldbank.org/en/results/2021/11/04/fueling-an-engine-of-sustainable-growth-agricultural-innovation-in-peru

Rigorous analysis of extension and technology transfer interventions, using randomised control trials (RCTs) have provided more robust evidence on the impact of a variety of programmes and projects (McNamara, 2020). While these are not the classic ex-ante EFAs, they do provide a wealth of information on project impacts and lessons learned which can drive future work.

Up until now we have discussed EFA generally for any investment project. Below we provide an overview of the potential methods for calculating EFAs with AHCI projects. There are two cases where the training or extension actions are embedded within a package of interventions and one where the intervention focuses solely on human capital investments. This section also provides links to EFA analyses completed on projects with considerable AHC components or activities. It also contains a more detailed presentation of the overall approach to EFAs in projects.

Potential methods to identify and quantify AHCI costs and benefits

The quantification of benefits and costs associated with investments in human capital (e.g. education, training) is a challenging exercise in the economic analysis of project appraisals. Quantification of AHC costs and benefits is often omitted from direct EFA valuations and discussed in qualitative terms only or evaluated in the "package approach" (as in Case 1 below). However, there are options to include AHC valuations in project appraisals. These will depend on the nature of the project with two potential cases discussed below.

CASE 1

CALCULATION OF AHCI COSTS AND BENEFITS WHEN THE INTERVENTION OR PROJECT IS TREATED AS A "PACKAGE SOLUTION"

The project or intervention assumed in Case 1 constitutes a package solution delivered to direct beneficiaries (farmers) as a set of well-coordinated components that may include: support (a loan or grant, for example) to obtain improved inputs (seeds, fertilizer, irrigation) plus appropriate farm management, storage and marketing training (e.g. when to seed, how to tend to crops, how to store, pack, market). With such a package solution the AHC benefits and costs are embedded in the overall benefits and costs for these farmers will experience.[4] The separate AHC valuation in these cases is very hard to calculate as it is difficult to directly capture the pure effect of training on the income increase for a beneficiary farmer. There are too many confounding factors (e.g. better seeds, better fertilizer and other farmer-specific factors) that may influence the income increase. Investors, whether government or international financial institutions will not pursue a separate analysis of costs and benefits. However, the appraisal of an intervention or project is relatively straightforward and usually pursued in financial and economic terms. This assumes the realization of AHC benefits and costs is accounted for in the net project or the gains for the direct beneficiary; that is, what the farmer gained from the intervention and the income increase. As described in Box 6.3 and Figure 6.1, one can use the WOP, WP and incremental scenario to analyse the package. As many development projects bring a package solution, there is less need to disentangle these potential benefits. In such cases, the appraisal generally takes place in financial and economic terms using a standard form.

BOX 6.3

WITHOUT PROJECT (WOP), WITH PROJECT (WP) AND INCREMENTAL SCENARIOS

WOP scenario

This scenario shows the situation before introducing the proposed investment or intervention and the situation if the status quo continued. (Generally, a dynamic WOP scenario, not a static one, should be modelled as the situation is likely to change even without any intervention.)

WP scenario

This scenario outlines the predicted situation after introducing the investment or intervention. In the ex ante modelling, this scenario needs to be based on well supported assumptions about the future situation (e.g. how the status would change in future if the intervention was implemented). These assumptions are usually based on a combination of sources: interviews with various actors, literature research, available data (national and international) and inflation forecasting.

4 See excellent example of the Government of Pakistan in IFAD. 2021. Khyber Pakhtunkhwa Rural Economic Trans-formation Project. Project Design Report. Annex 12, pp. 53-68. www.ifad.org/en/-/pakistan-2000002333-kp-retp-project-design-report-november-2021

Incremental scenario

This constitutes the difference between the WP and WOP scenarios (WP-WOP) and shows the expected impact of the investment or intervention on individuals or groups of individuals. The incremental changes are the most important to examine from the investment point of view as they predict the impact of the investment or intervention. For more details, please refer to Figure 6.1.

SOURCE: Authors' own elaboration.

CASE 2

CALCULATION OF AHC COSTS AND BENEFITS WHEN INTERVENTION OR A PROJECT COMPRISES SOLELY A TRAINING COMPONENT

The project or intervention in Case 2 differs from Case 1 because the quantification of the project or intervention's benefits and costs have to be transferred to the sphere of evaluating intangible effects (economic valuation). Even though the costs of preparing and implementing such training are usually well known, the economic costs may need to be estimated for training recipients (e.g. the value of time spent training). The most challenging task will include evaluating the economic benefits from the training. To disentangle benefits from AHC improvements, one needs to use experimental techniques such as RCTs and non-experimental ones such as regression discontinuity, propensity and score matching. There may be several designs depending on the context and nature of the project but these are usually expensive and time consuming. There may be reservations from government officials, beneficiaries, and other about using RCTs. As part of an ongoing project, FAO is working with Innovations in Poverty Action (IPA) to examine RCTs that aim to isolate the impact of training and technology transfer programmes on human capital development. Usually, if evaluators do not have enough time to prepare such an analysis (without the luxury of running an RCT) they conduct a literature search, referencing past research and projects with assumptions on the potential yield increase to farmers who receive training and calculating the economic benefits from increased income. The analyst usually runs a sensitivity analysis on this assumption of yield from training to show several "what if" scenarios (e.g. what would the situation be if training increased the yield by 50 percent, 40 percent or 30 percent).Another way of doing a training EA is to assess "the added benefit of having incremental levels of training". Through reference studies one can understand how incomes have increased for farmers who received more intensive training, those who received less intensive training or none at all and then compare the effect of yield/incomes on the degree of training. For more information about sensitivity analysis, please refer to Box 6.5.

Overall approach to economic and financial analysis, ex ante investment appraisals in projects

In their standard forms, investment appraisal methodologies commonly known as EFAs use multiple tools to estimate ex ante financial, economic, social, and environmental impacts. The widely used methods postulate separate analyses to tackle financial, economic, social, and environmental studies individually rather than as a part of a bigger and interconnected entity. Integrating all these analytical building blocks and their joint consideration in investment appraisal is the key to a more thorough analysis. The standard EFA should be considered a cost-benefit analysis (CBA) but taken one step further to provide an evaluation in the form of an integrated investment appraisal (IIA). An IIA typically includes three scenarios: WOP scenario, WP scenario and incremental scenario (see Box 6.3 and Figure 6.1 for more detail on these scenarios). Additional analytical steps like sensitivity analysis and stakeholder and distributional analysis are natural analytical extensions.

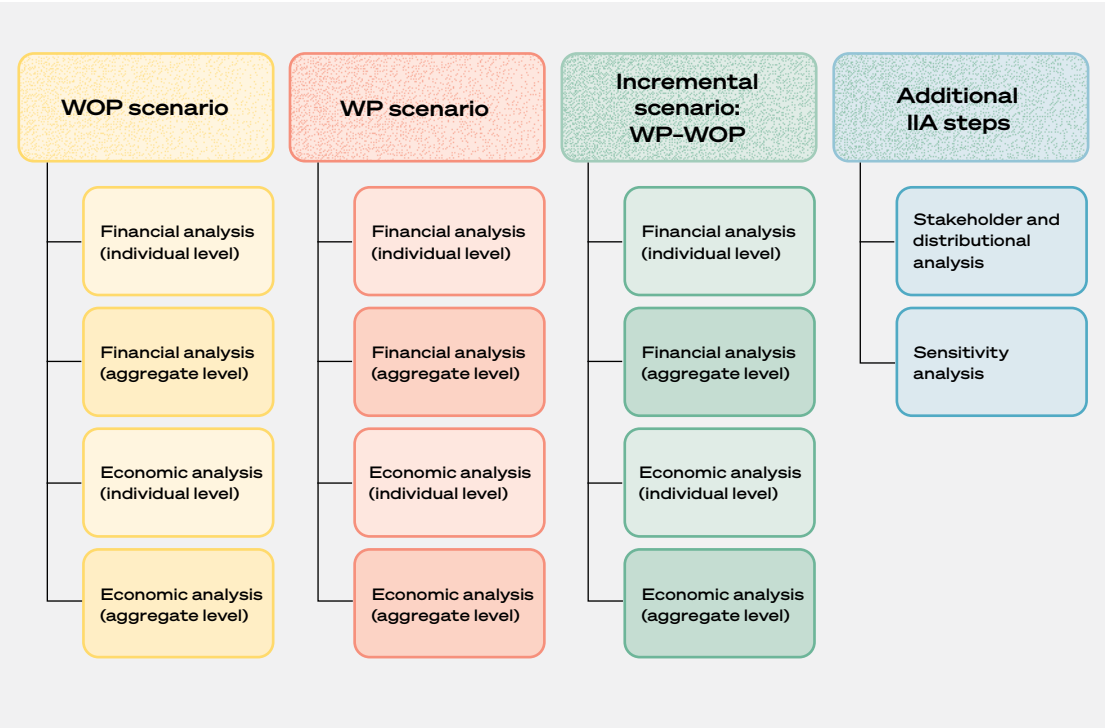


Figure 6.1
Integrated investment appraisal methodology

SOURCE: Authors' own elaboration.

The three scenarios

The WOP scenario should show the situation before the intervention or project. However, all inflows and outflows in the financial part of the analysis of benefits and costs and the economic part should also predict how these variables may change over time. The analytical steps look the same in the case of the WP scenario (after the intervention or project starts). This requires modelling of some level of forward looking expectations about the measurable effects. This usually involves various assumptions concerning yield and expected prices. This is where field interviews are crucial as are other secondary sources of data (e.g. statistical offices, various ministries, websites of international organizations, literature, reports, project impact evaluations, and many more). The incremental scenario is the difference between the WOP and WP scenarios. It shows the incremental change after the intervention or project. Depending on the type of analysis (financial and economic or economic only), the incremental scenario will show financial and economic or economic results only.

Further analyses

Beyond these basic analyses, sensitivity and stakeholder distributional analyses are possible. Sensitivity analysis should move certain influential variables and recalculate all net present values (NPVs), internal rates of return (IRRs) and all the profitability measures using new levels of these variables. At the minimum analysts examine varying increases in costs and decreases in benefits and conduct sensitivity analysis around these changes but it is possible to use much more nuanced considerations to conduct the analysis. Distributional analysis can show which stakeholders will benefit from the project and by how much, recalling that the standard group of stakeholders are project beneficiaries, the government, and the entire economy. Stakeholder distributional analysis can take place if there is a financial and economic part to the analysis. Further descriptions on distributional analysis can be found at the Investment Centre, Investment Learning Platform (FAO, 2022a).

Defining direct beneficiaries and attribution of costs and benefits

One of the critical elements of any investment appraisal is defining the direct beneficiaries of the project or intervention whose perspective forms the basis of the analysis. The definition of direct beneficiaries is key as analysis from a farmer's perspective will be different to that of a commercial bank that provides a loan to the farmer. Attribution, being able to say with certainty a project intervention led to greater production, productivity, empowerment and other desired outcomes, is very challenging. The WP and WOP scenarios can attempt to analyse this, using arguments from the theory of change but these cannot account for costs and benefits in all cases.

The rationale for pursuing a financial and economic analysis

A financial analysis is necessary and justified when the proposed intervention or project will yield financial inflows (or revenues) to direct beneficiaries. A very common example is a project where a farmer receives a loan with a subsidized interest rate to improve farming (e.g. via increased production efficiency). Such a loan is likely to increase the farmer's income in years to come. It is possible to estimate cash flows because there is an expectation about actual financial

inflows and outflows. The natural extension of such an analysis would be to convert all financial prices (financial cash flows) into economic ones using conversion factors (CFs) and to construct economic resource flows. The appraisal could include both financial and economic parts in such a case.

The rationale for an exclusively economic analysis

There are projects where beneficiaries will not observe a tangible income increase as they will not observe direct financial inflows from the project. An example of such a development project is providing Wi-Fi to a community. In this case, farmers will gain some economic benefits, but no financial inflows (revenues) are recorded, even though the financial costs are likely to be known. Consequently, the analysis needs to economic terms in such a case. Therefore, estimation of financial cash flows is not possible. The rationale for the financial analysis is that beneficiaries observe financial inflows and outflows so the tangibility of these flows is essential. The financial part of the analysis should adhere to at least some basic accounting principles, where all entries are included in a common denominator. For the economic analysis, tangibility is not necessary as costs and benefits can be present without observing actual cash flows. While the valuation of financial inflows and outflows is relatively simple, being based on observed market prices, the valuation of economic benefits and costs frequently uses indirect methods, some of which may be intensive and time-consuming.

Quantify intangible benefits and costs

Intangible benefits are those attributed to the project or intervention, but cannot be measured in direct financial terms. They bring an additional level of complexity to investment appraisals. The first issue relates to a proper definition. This definition and determining applicable intangible costs and benefits are likely to be specific to each project or intervention. The second issue concerns how to value them accurately. While field interviews, similar projects and peer-reviewed literature can offer an assessment of the potential spectrum of costs and benefits, their valuation can be a significant obstacle as methods applied elsewhere may not be suitable. Box 6.4 contains further details on possible steps to evaluate intangible benefits.

BOX 6.4

STEPS IN VALUING INTANGIBLE BENEFITS AND COSTS

STEP 1 **Define applicable costs and benefits.** All potential intangible costs and benefits that accrue to beneficiaries from the AHCI intervention need to be defined. The definitions usually come from field interviews, past literature, similar projects pursued elsewhere, and other secondary resources. For AHCI projects, potential costs may include the farmer's time spent attending training. The value of this time subtracted from regular daily tasks does not have an immediate price, but it is possible to estimate it using the indirect valuation method (see Step 2). An intangible AHCI benefit might be better organization of the project's community of farmers after training when they may be more willing to cooperate. Cooperation, in turn, can bring more cohesion to a community and decrease the number of disputes. There is a method to value time savings from reducing the number of such conflicts.

STEP 2 **Decide which costs and benefits can be quantified.** Among the potential costs and benefits in Step 1, there will be some that can be quantified using indirect methods and some that cannot because there are no methods to value them. In the EFA, only quantifiable costs and benefits are included in economic resource flows. All other potential costs and benefits are usually discussed only in qualitative terms (in qualitative analysis, as per Step 4 below). Depending on the type of costs and benefits, there may be different ways to quantify them, the most popular is to use the concept of opportunity cost.

1. Value time (gains or losses) using the opportunity cost of labour measured as the average daily wage in the area.
2. Use cost savings arising from switching from the standard technology/management in the WOP scenario and them as benefits in the WP scenario.
3. Value forgone wages as the economic costs of implementing automation or digital solutions that diminish labour demand.
4. Some other methods may include more time consuming and elaborate methods.
5. Use future potential income gains due to educational attainment as benefits of the education or training.
6. Employ contingent valuation methods and surveys of farmers who received training.

Choosing a suitable valuation method depends on multiple factors like data availability, the time for the analysis and funding. For ex ante EFAs, time is usually a limiting factor and valuations usually occur without any surveys or an actual valuation of future potential income gains due to training. Quantifying these benefits and costs usually follows methods 1–3, described above and the effects observed elsewhere (past projects, literature review).

STEP 3 **Include quantified costs and benefits in economic resource flows.** All derived potential costs and benefits valued using methods in Step 2 are included in the resource flows as economic costs or benefits, respectively. The standard measures of investment sustainability (economic NPV, economic IRR) are then calculated as in the case of costs and benefits priced directly.

STEP 4 **Qualitative discussion of costs and benefits that could not be valued.** All costs and benefits that cannot be quantified are normally excluded from the economic resource flows as there are no numerical values assigned to them. However, the expected size of these costs and benefits is normally discussed in a qualitative analysis.

SOURCE: Authors' own elaboration.

Choosing proper discount rates

A discount rate is the opportunity cost of funds invested in a project. It is a critical variable in applying investment criteria to select an investment. Choosing the right discount rate is essential as even a slight variation can profoundly affect the net incremental results (Box 6.5).

BOX 6.5

FINANCIAL AND ECONOMIC DISCOUNT RATE

Financial discount rate

In the context of the financial part of the EFA, the proper discount rate is the one that applies to equity holders. The relevant cost of funds is the return on equity earned from its alternative use.

Economic discount rate

In the economic part of the analysis, the economic discount rate is the economic opportunity cost of capital (EOCK). Estimating this is an uneasy task as it needs to start with the capital market as the marginal source of funds. In practice most governments set the social discount rate used in the calculation of cost benefit analysis. For example, the Office of Management and Budget of the Government of the United States of America has set it at 7 percent (OMB, 1992), while in Peru's case it is 8 percent for projects with 20 years or less impact and analysis (MEF, 2019).

Although the most recent EOCK is not known, a sensitivity analysis on the latest known value assumes different levels to see how profitability and economic sustainability change under different EOCK values.

SOURCE: Authors' own elaboration.

Deciding on an analytical timeframe
Investment decisions are fundamentally different from consumption decisions as a unit of money spent or received today is worth more than one sometime later. For EFA modelling, the typical analytical timeframe is a minimum of ten years. A shorter time is not advisable as it is hard to show the entire stream of investment benefits. However, the analysis can be extended over a number of years, 15 or 20, if need arises and a rationale exists to pursue this analysis for longer.

Dealing with uncertainty and risk
Financial cash flows and the economic resource flows of each EFA model can include only one entry per year for each inflow or outflow. But this is not realistic, given that uncertainty in the price of inputs and outputs, inflation and exchange rates etc., is the norm. It is important to address these uncertainty issues around the proposed investment as the results and recommendations should not be based on deterministic values. Sensitivity analysis tools are there to help tackle this problem (Box 6.6).

BOX 6.6

SENSITIVITY ANALYSIS

Steps in conducting a risk analysis

While it is not possible to predict upfront the exact variables that need to be sensitized, it is possible to outline the task. The following steps will help assess the risk level for an investment or intervention.

STEP 1 Identifying risk variables through sensitivity analysis

This step evaluates how sensitive are the project outcomes (e.g. FNPV, ENPV) to changes in the value of one parameter (also known as "what if" analysis). This process is repeated for each variable expected to impact on the outcomes of the investment. The sensitized variables must constitute a large share of cash receipts or disbursements, and their impact on the investment must be significant within the range of probable values.

STEP 2 Scenario analysis

This involves analysing changes in two or more variables and the combined effect of these changes, investigating how sensitive are the project's outcomes (e.g. FNPV, ENPV) to changes in the value of these variables.

STEP 3 Monte Carlo analysis

This is a natural extension of sensitivity and scenario analysis. Monte Carlo simulation creates multiple versions of the future based on what may happen by studying and defining the expected variability in the input parameters of the EFA modelling.

SOURCE: Authors' own elaboration.

As noted by McNamara (2020) it important to include full intervention costs such as project management, training of trainer costs, institutional implementer costs (i.e. ministries and/or NGOs) and direct farmer and opportunity costs, to fully capture the costs of interventions. Often it will be necessary to use estimations, proxies and information from prior analyses to prepare estimates of financial and economic benefits.

AHCI related appraisals are challenging and the results are approximations (unless using experimental or quasi-experimental methods), even when essential for programme and project preparation. Such results will be context specific, probably inaccurate on the benefits side and somewhat true only under stated assumptions. These assumptions need to be strong and rather inflexible. But even when there is an RCT involved, the results are likely to be region and training specific. This complicates things when striving for a template-like approach. See Box 6.7 for further considerations when conducting EFAs with AHCI projects.

BOX 6.7

ADDITIONAL USEFUL EFA MODELLING REMARKS

The WOP scenario and its challenges

The challenge with the WOP scenario is that analysts often do not create it at all or when they do, set up unrealistic WOPs (showing negative returns) that compound benefits due to the mathematical construction of the incremental scenario (WP-WOP). If WOP = -200 and WP = 100, the result of 100-(-200) = 300 is an incremental gain, hence an incremental benefit. The illogic of such a setup is clear. If an analyst cannot establish a WOP scenario due to lack of data, it is advisable to appraise only the WP scenario and treat it as an incremental scenario to avoid this problem.

Financial versus economic prices

Financial prices of inputs and outputs come from the meeting of supply and demand in any given market. They normally include various taxes (including trade taxes), subsidies, market power and other distortions and are used in the financial part of the analysis (financial cash flows). The economic prices of inputs and outputs, in turn, should exclude all taxes, subsidies, market power and other distortions and should constitute so called “shadow prices”. It is possible to calculate these through CFs that adjust financial prices to economic ones by excluding market distortions in financial prices. It is important not to mix financial and economic prices nor combine them in one flow of cash or resources. Special diligence is advised.

Greenhouse gases and other quantified environmental effects

Whenever possible the economic part of the analysis should include a valuation of environmental impacts. If the volume of carbon emissions is known, it should be priced using proper shadow pricing and included in the resource flows of the economic part of the EFA.

SOURCE: Authors’ own elaboration.

Cost effectiveness analysis

Another option to assess AHCI benefits is cost effectiveness analysis (CEA). This can be used instead of a standard EFA (or CBA) if quantifying benefits is impossible. However, these methods should apply to all the project's components, not only the AHCI part of estimations.

This method analyses investment possibilities after setting the project's goals (e.g. competency scores, accreditation standards, learning costs, standardized test scores.) It is used when benefits from expenditure are hard to measure but the costs are obvious. It helps to choose the least expensive option among a group of alternatives that produce the same result (a set of predetermined objectives). For AHCI cost effectiveness it can assess the mode of dissemination and location after the project's goal, such as learning outcomes, to determine the best investment alternative (e.g. digital classrooms or farmer field schools.). It is a less data demanding technique and indicates the least costly way to achieve an objective within a specified level of costs.

The process entails first listing and quantifying the costs of the different options in monetary terms before contrasting them with those incurred in the base scenario or with threshold costs. The results are then compared to determine the least expensive intervention after total costs are discounted at year 1. In other words, valuation by cost effectiveness compares, on a present worth basis, all alternatives that can achieve the same benefit (Gittinger, 1985) and selects the least costly.

Both CEA and CBA can be used on the same project and are compatible. After a CBA has determined a particular public investment is warranted, CEA looks at project design possibilities to deliver anticipated outcomes at the lowest cost. However, any cost savings through CEA from selection of an efficient option can be used as benefits while conducting the CBA.

Example of cost effectiveness analysis

A programme manager plans to introduce new training in ag-tech for 25 young agripreneurs, approved by the Skills Council with a budget of USD 1000 per trainee. The manager has two options for conducting the training: (a) computer-based training followed by a three-day practical workshop; and (b) an intensive, two-week workshop followed by two on-site training sessions. Table 6.1 presents all the costs associated with each type of training. A graduate who scores 80 percent on the evaluation meets the standards set by the Skills Council.

Table 6.1
Comparative costs for two distinct approaches to training

Total cost of conducting the training	Computer-based training and three-day workshop	Intensive two-week workshop and two on-site training sessions
Cost of training	USD 12 025	USD 20 000
Cost of follow up support	USD 8000	USD 2000
Total cost of transfer of learning	USD 20 025	USD 22 000
Trainees	25	25
Cost per trainee	**USD 801**	**USD 880**
Trainees who meet the Skills Council standards	15	22
Cost per trainee who meets the performance standard	**USD 1335**	**USD 1000**

SOURCE: Authors' own elaboration.

In spite of post-training support, only 15 graduates of the computer-based training met the required standard, whereas 22 graduates of the intensive training did so. A simple cost analysis shows the computer-based training followed by a three-day practical workshop is the more efficient method regarding total costs as well as the cost per training programme. But after taking account of the training programme objectives, the cost per successfully trained and accredited graduate of the computer-based training is USD 1335 versus USD 1000 for the intensive training.

The key to this result is collecting cost data on all the activities in the training and measuring effectiveness in terms of accredited candidates. Measuring success simply by the number of trainees means the lower cost per trainee may displace competence as the basis for selecting a training option.

©Pexels/sippakorn-yamkasikorn

©Pexels/Thor Garlan

Module 7
Key messages and recommendations on investing in AHCI

This toolkit and the other studies in this AHCI series provide a rich base for key messages on improving the quality and impact of AHCI. We present seven key messages from the global synthesis report as recommendations. Box 7.1 details areas for further evidence building as new projects or programmes come on stream.

Figure 7.1
Key recommendations for investing in farmers

SOURCE: Davis *et al.* 2021. *Investing in Farmers: Agriculture Human Capital Investment Strategies.* Rome, FAO and IFPRI. https://doi.org/10.4060/cb7134en

1 **Promote agriculture human capital and invest more in it.**

This may seem obvious coming from this toolkit, but it is important to advocate for including human capital in programme and project designs because we have seen that these activities may be hidden or not explicitly included when in fact AHCI can be the key to their success. We have seen this may refer to an entire programme/project, sub-components or just key activities within an initiative but it is important to advocate for using the elements from this toolkit to design the intervention. It is also important to identify the benefits and costs of the intervention, within the scope of larger initiatives. Use the evidence of the impacts to justify the intervention (see Module 4).

Critical point. Agriculture human capital investment leads to outcomes and impacts in the medium and long term and has many positive societal spillovers, such as increased citizen participation, empowerment and rural incomes, literacy improvements, food security and better health. While the effects of human capital investments may be difficult to measure with return frameworks that are hard to predict, it is critical to invest in such capital because the results are long-term and wide-reaching. Unlike other types of capital, it is not easy to erode or destroy human capital. This is particularly relevant today with frequent human displacement and population movements as human capital is both personal and portable. It is thus important to incorporate AHCI in most types of agriculture and rural development investment projects (e.g. value chains, market access and climate mitigation and adaptation).

2 **Partnership and collaboration are essential.**

The complex, holistic nature of AHCI programmes means partnerships and multi-stakeholder platforms are necessary to advance human capital initiatives. They are essential to public and private partnerships with rural entrepreneurs (like community workers in India), value chain actors and producer groups (IFAD, 2022b. Include explicit linkages and key performance indicators (numerical evidence of progress towards the desired result alongside more direct farm productivity/resilience actions.

Critical point. Partnering can ensure holistic integration, provide incentives for learners, help sustain efforts through multiple funding channels and scaling up. Collaborative policies can make AHCI more conducive because of the numbers of actors potentially involved, each of whom can contribute technical and financial resources. Digital service providers, producer organizations and private sector players each have their own assets and approaches that can help to make a programme stronger and richer. However, to achieve sustainable partnership beyond the programme, it is important to reflect on the motivations and incentives for each member, considering the value propositions of the extension/human capital development (IFAD, 2016).

3 **Delivery methods matter.**

Appropriate human capital development methods need to be client driven and adapt to the needs of the clientele. Each method also has an enabling environment, policies, operational considerations, costs, benefits, inclusion, and sustainability considerations. Module 4 contains 16 potential methods and tools with their advantages, range of costs, target audiences, and the toolkit provides a rich set of background resources to draw from, including concrete cases. Different methods are often complementary and reinforcing, as when using digital media such as videos and radio with farmer field schools or other face-to-face extension approaches.

Critical point. Implementation (especially as initiatives are scaled up) should not be static but adapted to the needs of participants. It helps to standardise the core principles but adapt the methodology, much like the farmer field school approach. A customised approach may be more difficult and costly, but it is important to facilitate human capital development according to the clientele. Minimally, programmes need to develop adequate stakeholder engagement and feedback from beneficiaries and adapt accordingly. Several cases from the global synthesis mentioned the importance of practical learning. Experiential learning and alternating from theory to practice and relating experience back to theory can help to reinforce learned skills, as can the power of social interactions and a community of practice. Initiatives from Kenya, Rwanda, and Peru used group approaches and/or community leaders to reinforce learning objectives. The use of digital tools to deliver agriculture human capital development should be thoughtfully explored. Digital technologies bring many benefits, such as the ability to reach wider audiences at lower costs (Sylvester *et al.*, 2021). They also have caveats: many people do not have access to or cannot afford digital tools. However, the COVID-19 crisis has induced digital innovation. It will be beneficial for the building blocks (policies, legislation, public/private incentives, infrastructure, training programmes and others) and access to digital technologies for future human capital investment.

4 **Leave no one behind.**

The case studies and other evidence in this toolkit showed AHCI that successfully targeted groups of farmers whose inclusion in development projects or programmes is not always a given and these are key to strengthening AHC. While selecting a typically marginalised target group is one thing, designing and implementing a model of human capital development that actually facilitates these groups' inclusion is another. Culturally relevant training/educational methods should be used. FAO and the African Union Commission offer sound guidance on how to involve members of marginalized groups, such as youth and women, in the design, implementation and evaluation of programmes (FAO and AUC, 2022).

Critical point. When investing in or designing an AHCI model, it is crucial to first understand the cultural, societal, and economic limits to the participation of youth, Indigenous Peoples, remote, poor, or female producers. The methods, timing and location of the interventions can limit participation. Understanding how to develop skills and also build confidence among learners is a key feature of a model targeting farmers with unrecognised potential. Other limitations may be logistical or financial – a model that succeeds in overcoming all these limitations will be truly inclusive. Human capital development is a long-term investment and this is one reason it is valuable to invest in young people, offering them learning opportunities to acquire hands-on experience they otherwise may lack. Integrating vocational training, apprenticeships or work-study mixed training in an AHCI model may be valuable. A variety of entry points and approaches may be necessary to reach all the intended participants. This implies using multiple methods and approaches.

5

Provide incentives for learning.

For AHCI to be successful in building farmers' capital as well as sustaining its impact, motivating learners and incentives for participation in learning is key. This can be seen in the AHCI series case study on Chile with access to stable markets and specialised technical support and India's market access and insurance services.

Critical point. One way to ensure motivation is to promote ownership of learning by incorporating participation and decision-making into the model. A key lesson from the AHCI series is the need for farmers to design their own development plans or choose the crops they want to produce, thereafter providing the tools and skills for this. . Feedback is another important aspect of learner participation. It is essential this type of participatory approach remains relevant to be able to empower local communities and adapt to disruptive changes. Actions must be based on a vision and values shared by all the actors. Ensuring participation while communicating incentives for learning is also fundamental to motivation. As we learned from the ACHI series case studies, farmers who clearly understood the opportunities their new skills can offer enjoyed high levels of self-determination and endurance when taking on the challenges of learning something new or a change of mindset.

When implementing human capital development models, make sure that: a) there is an incentive for learning rooted in the needs and aspirations of farmers; b) incentives are clearly communicated and explored with farmers; and c) such incentives are attainable. If they remain out of reach despite building human capital, chances are farmers will see no reason to learn the new practices. Many models integrate market access as a successful learning incentive. But while economic incentives (increased sales, yields, or incomes) are crucial, especially for poor households, there are many other valid reasons for learning. Greater self-confidence, recognition in the community, a better division of labour within families, or the preservation of cultural traditions are all incentives that relate broadly to well-being, identities, and livelihoods, all of which can be realised when developing human capital (Friis-Hansen and Duveskog, 2012).

6

Use the evidence on AHCI in programme and project design

As noted in the EFA section, government officials, international financial institutions and others seek evidence of programme and project worthiness before investing in them. This is more so the case with AHC. This means using existing and new evidence on the variety of AHC investment options. Further, it means answering new questions on potential programmes and project interventions.

Quality ME and continuous feedback allow for improvement and updating to optimise the implementation mechanism. One example from the global AHCI synthesis, used an app-based monitoring system. Local implementers or trainers can also provide important feedback on how the training is received and what else may be needed. International knowledge exchange allows the most relevant and current knowledge to inform experiences in the field.

Critical point. Impact evaluations can be costly especially if using RCTs. They imply the availability of robust baseline information with or without project information. This may not be realistic in all cases. Decision-makers may rely on existing studies or earlier project designs to make their case. The EFA section provides a good range of existing materials and examines the use of RCTs.

There are a number of areas which need more information regarding AHCI (Box 12). While this is not the task of the project or programme designer it is useful to know some of the research gaps where such information is needed. It is important to encourage the use of ME tools to at least record farmers' participation, learning and key results (knowledge, attitudes and practice indicators) as part of a logical framework. This can be done more easily thanks to ICT simple data collection tools used by community workers and group leaders.

BOX 7.1

THE NEED FOR MORE AGRICULTURE HUMAN CAPITAL RESEARCH

New project designs are an excellent opportunity to seek answers to questions and provide further evidence on outcomes from human capital investment. We include here a number of areas where further evidence would be very useful in AHCI.

- What is the interaction between different types of human capital generated? Is there an ideal mix between human and social capital?
- What are the economic trade-offs to consider when designing human capital investment projects?
- Which investment options are high impact?
- What is the best way to capture AHCI costs and benefits when actions are subsumed into other larger project components?
- What are the long-term impacts of investing in farmers, for individuals but also society, some 10–20 years after the investment?
- Are there particular human capital investment needs to support climate smart agriculture?
- Which sectors are investing in AHCI?
    - How much do national and subnational governments finance agricultural human capital investment and how do those amounts compare to donor financing?
    - Does donor funding for agriculture human capital development mobilise country funding or crowd it out?
    - What are the private sector and civil society (e.g. farmers' organizations) contributing to AHCI?
- With regards to younger people, do agricultural human capital programmes lead to more of them staying in rural or peri-urban regions instead of migrating to urban areas?
- Does agriculture human capital invested in women lead to enhanced outcomes and impacts?
- What are the best ways to build human capital in fragile or marginalised contexts such as Indigenous Peoples, pastoralist or nomadic husbandry groups, displaced people and in post crisis situations?
- Is there a role or interrelation between human capital and conflict mitigation or peacebuilding?
- Which unique skills and attributes are needed among human capital development actors to accelerate success?

SOURCE: Authors' own elaboration.

©Pexels/Ishay Botbol ©CIFOR/Axel Fassio

References

Alemayehu, N. 2013. *Farmer training centres and the IPMS programme in Ethiopia; Improving the productivity and market success of Ethiopian farmers' programme*. Canadian International Development Agency. IPMS, Addis Ababa. https://cgspace.cgiar.org/bitstream/handle/10568/33314/FTC_Nigatu.pdf?sequence=1

Amanah, S. Suprehatin, S., Iskandar, E., Eugenia, L. & and Mutiara, R. 2021. *Investing in farmers through public-private-producer partnerships: Rural empowerment and agricultural development scaling-up initiative in Indonesia.* Rome, FAO and IFPRI. https://doi.org/10.4060/cb7126en

Atteridge, A., Savvidou, G. & Meintrup, L. 2019. *Aid Atlas.* Stockholm Environment Institute (SEI). https://aid-atlas.org/about/sectors#agricultural-water-resources

Atuya, C. 2017. *Trade fairs for better agricultural practices.* CTA Wageningen, Netherlands. https://cgspace.cgiar.org/bitstream/handle/10568/96627/Exp_Cap1_Atuya_en.pdf?sequence=1&isAllowed=y

Bentley, J., Chowdhury, A. & David, S. 2018. Videos for agricultural extension. In: Davis, K., Bohn, A., Franzel, S., Blum, M., Rieckmann, U., Raj, S., Hussein, K. and Ernst, N. (eds). *What works in rural advisory services? Global good practice notes.* Lausanne, Switzerland: GFRAS. www.g-fras.org/en/gfras/1040-what-works-in-rural-advisory-services.html

Bernard, T., Makhija, S., Orkin, K., Tafesse, A.S. & Spielman, D.J. 2016. *Assessing the impact of digital green's video-based extension approach to promoting technology adoption among smallholder farmers in Ethiopia: A feasibility study.* Addis Ababa / Washington, DC / Oxford: International Food Policy Research Institute. www.digitalgreen.org/wp-content/uploads/2017/06/Study-by-IFPRI-on-Video-based-ag-extension-in-Ethiopia.pdf

Bicksler, A.J., Bates, R., Burnette, R. & Thansrithong, B. 2014. *The current and future roles of small farm resource centers in extension and advisory services. Synthesis report from seven case studies in Southeast Asia.* MEAS. http://dev.meas.illinois.edu/wp-content/uploads/2015/08/MEAS-CS-SFRC-0-Synthesisand-Lessons- Learned-November-2014.pdf

Bruns, B. 2002. *Exchange visits as a learning and networking tool.* Environment and Development Affinity Group, New York, Ford Foundation. https://dlc.dlib.indiana.edu/dlc/bitstream/handle/10535/4479/Bruns-Exchange_Visits.pdf

Clarkson, G., Garforth, C., Dorward, P., Mose, G., Barahona, C., Areal, F. & Dove, M. 2018. Can the TV makeover format of edutainment lead to widespread changes in farmer behaviour and influence innovation systems? Shamba Shape Up in Kenya. *Land Use Policy,* 76. ISSN 02648377. https://doi.org/10.1016/j.landusepol.2018.05.011.

Coggins, S., McCampbell, M., Sharma, A., Sharma, R., Haefele, S.M., Karki, Hetherington, J., Smith, J. & Brown, B. 2022. How have smallholder farmers used digital extension tools? Developer and user voices from Sub-Saharan Africa, South Asia, and Southeast Asia. *Global Food Security* 32. www.sciencedirect.com/science/article/pii/S2211912421000857

CRS (Catholic Relief Services). 2017. *Agricultural fair and voucher manual.* Baltimore, Catholic Relief Services. https://www.crs.org/our-work-overseas/research-publications/agricultural-fair-and-voucher-manual-1

David, C. 2020. *Community, crowdsourcing and commerce: WhatsApp groups for agriculture in Kenya.* School of International Development and Global Studies. Ottawa, University of Ottawa. https://ruor.uottawa.ca/handle/10393/41530

David, S. & Cofini, F. 2017. *A decision guide for rural advisory methods.* Research and Extension Unit. Rome, FAO.

Davis, K., Bohn, A., Franzel, S., Blum, M., Rieckmann, U., Raj, S., Hussein, K. & Ernst, N. 2018. *What works in rural advisory services? Global Good Practice Notes.* Lausanne, Switzerland: Global Forum for Rural Advisory Services. https://www.g-fras.org/en/gfras/1040-what-works-in-rural-advisory-services.html

Davis, K., Gammelgaard, J., Preissing, J., Gilbert, R. & Ngwenya, H. 2021. *Investing in farmers: Agriculture human capital investment strategies.* Rome, FAO and IFPRI. https://doi.org/10.4060/cb7134en

Davis, K., Nkonya, E., Kato, E., Mekonnen, D.A., Odendo, M., Miiro, R. & Nkuba, J. 2012. Impact of farmer field schools on agricultural productivity and poverty in East. Africa. *World Development* 40(2): 402-413. doi: 10.1016/j.worlddev.2011.05.019

Degrande, A., Tchoundjeu, Z., Kwidja, R. & Foupe, G.F. 2018. Rural resource centers. *In:* Davis, K., Bohn, A., Franzel, S., Blum, M., Rieckmann, U., Raj, S., Hussein, K. & Ernst, N. What works in rural advisory services? Global Good Practice Notes. Lausanne, Switzerland: Global Forum for Rural Advisory Services. www.g-fras.org/en/gfras/1040-what-works-in-rural-advisory-services.html

DFID (Department for International Development). 1999. *Sustainable livelihoods guidance sheets.* London, DFID.

Dhamankar, M. & Wangtschowski, M. 2018. Farmer field schools. *In:* Davis, K., Bohn, A., Franzel, S., Blum, M., Rieckmann, U., Raj, S., Hussein, K. & Ernst, N. 2018. What works in rural advisory services? Global Good Practice Notes. Lausanne, Switzerland: Global Forum for Rural Advisory Services. https://www.g-fras.org/en/gfras/1040-what-works-in-rural-advisory-services.html

Diez, A. & Correa, N. 2016. *Informe de evaluación: Desarrollo productivo y pobreza rural. Implementación y efectos del programa Haku Wiñay.* http://evidencia.midis.gob.pe/wp-content/uploads/2018/05/Informe_Final_6-2.pdf

Escobal, J. & Ponce, C. 2016. *Combinando protección social con generación de oportunidades económicas: Una evaluación de los avances del programa Haku Wiñay.* Lima, Perú: GRADE Grupo de Análisis para el Desarrollo.

Farm Radio International. 2014. *Farmer radio in sub-Saharan Africa: A snapshot. Final Report of the African Rural Radio Program Analysis Project.* Ottawa, Farm Radio International. www.farmradio.org/wp-content/uploads/Farm-Radio-International-ARRPA-Report-April-2014.pdf

Faure, G., Pautrizel, L., de Romemont, A., Toilier, A. Odru, O. & Havard, M. 2018. Management advice for family farms to strengthen entrepreneurial skills. *In*: Davis, K., Bohn, A., Franzel, S., Blum, M., Rieckmann, U., Raj, S., Hussein, K. & Ernst, N. 2018. What works in rural advisory services? Global Good Practice Notes. Lausanne, Switzerland: Global Forum for Rural Advisory Services. www.g-fras.org/en/gfras/1040-what-works-in-rural-advisory-services.html

Faure, G., Toillier, A. & Moumouni, I. 2018. How to scale Management Advice for Family Farms in Africa. *Canadian Journal of Development Studies.* 39:4, 515–532. DOI: 10.1080/02255189.2018.1447912

FAO (Food and Agriculture Organization of the United Nations). 2011. *Social analysis for agriculture and rural investment projects.* Rome, FAO.

FAO. 2012. *State of food and agriculture: investing in agriculture for a better future.* Rome, FAO.

FAO. 2016. *Farmer field school guidance document: Planning for quality programmes*. Rome, FAO. www.fao.org/3/i5296e/i5296e.pdf

FAO. 2019. *Dimitra Clubs: What's the Impact?* Rome, FAO. www.fao.org/fao-stories/article/en/c/1200214/

FAO. 2020. *The programme clinic designing conflict-sensitive interventions: approaches to working in fragile and conflict-affected contexts.* Rome, FAO. www.fao.org/3/ca7494en/ca7494en.pdf

FAO. 2022a. Investment Learning Platform. www.fao.org/investment-learning-platform/investment-cycle-phases/en/

FAO. 2022b. Tool for designing, monitoring and evaluating Land administration programmes in Latina America. Glossary. www.fao.org/in-action/herramienta-administracion-tierras/glossary/i/en/

FAO and AUC (African Union Commission). 2022. *Investment guidelines for youth in agrifood systems in Africa.* Rome, FAO and AUC. https://doi.org/10.4060/cb9001en

Franzel, S., Degrande, A. Kiptot, E., Kirui, J., Kugonza, J., Preissing, J. & Simpson, B. 2018. Farmer-to-farmer extension. *In:* Davis, K., Bohn, A., Franzel, S., Blum, M., Rieckmann, U., Raj, S., Hussein, K. & Ernst, N. 2018. What works in rural advisory services? Global Good Practice Notes. Lausanne, Switzerland: Global Forum for Rural Advisory Services. www.g-fras.org/en/gfras/1040-what-works-in-rural-advisory-services.html

Franzel S., Kiptot E. & Degrande A. 2019. Farmer-to-farmer extension: A low-cost approach for promoting climate-smart agriculture. *In:* Rosenstock T., Nowak A. & Girvetz E. eds. *The Climate-Smart Agriculture Papers.* Springer. https://doi.org/10.1007/978-3-319-92798-5_24.

Franzel, S., Miiro, R., Uwitonze, N., Davis, K., Luzobe, B. & Rurangwa, R. 2020. *Engaging young agripreneurs: Options to include youth in private sector extension and advisory services in Rwanda and Uganda. Developing Local Extension Capacity Project.* Washington DC, USAID. www.digitalgreen.org/wp-content/uploads/2017/09/DLEC-Study-on-Engaging-Young-Agripreneurs_Lessons-from-Rwanda-and-Uganda.pdf

Friis-Hansen, E. & Duveskog, D. 2012. The empowerment route to well-being: An analysis of farmer field schools in East Africa, *World Development*. 40:2:414-427. https://doi.org/10.1016/j.worlddev.2011.05.005

Friis-Hansen, E., Duveskog, D. & Taylor, E. 2012. Less noise in the household: The impact of farmer field schools on gender relations. *Journal of Research in Peace, Gender and Development*, 2(2): 44–55. www.interesjournals.org/JRPGD

GBC (Greater Baltimore Council). 2020. *Developing an internship program.* Baltimore MD, Greater Baltimore Council. www.towson.edu/careercenter/media/documents/employers/gbc_handbook_developing_an_internship_program_for_employers.pdf

Goldin, C. 2014. Human capital. *In:* Diebolt C. & Haupert M. eds. *Handbook of Cliometrics.* Berlin, Heidelberg, Springer.

Gordon, A. 2021. *Professionalizing farmer organizations through private sector-led models – Capacity development initiatives in Cameroon and Côte d'Ivoire.* Rome, FAO and IFPRI. https://doi.org/10.4060/cb7133en

Human Resource Professionals Association. 2010. Glossary of professional regulation and certification terms. Toronto, HRPA. https://docplayer.net/11405042-Hrpa-glossary-of-professional-regulation-and-certification-terms-1.html

IFAD (International Fund for Agricultural Development). 2016. *How to do Public-Private-Producer-Partnerships (4Ps) in agricultural value chains.* www.ifad.org/documents/38714170/40314128/Public-Private-Producer+Partnerships+%284Ps%29+in+Agricultural+Value+Chains.pdf/853d82f8-45c9-4493-b2da-b509112cc0b3?t=1555415705000

IFAD. 2022a. Knowledge-sharing broadcasts help female women farmers thrive. https://ruralsolutionsportal.org/en/-/knowledge-sharing-radio-broadcasts-help-female-farmers-thrive

IFAD. 2022b. Lessons learned from supporting pluralistic extension services. https://www.ifad.org/documents/38714170/46847063/lessons-extension-services.pdf/e7b2bbe5-c1d7-1438-21c7-1fb903efeafb?t=1669635950998

Jackel, D. 2011. Evaluating the effectiveness of an internship program. *Paper no. 117*. Service Learning Commons. Western Kentucky University. Bowling Green, KY. https://digitalcommons.wku.edu/theses/1117/

JICA (Japan International Cooperation Agency). 2008. *Agricultural extension methodology: A reference manual.* Agricultural Support Assist Project. Tokyo, JICA. https://ershad.moa.pna.ps/downloads/reports/2013 0728122608.pdf

Jones, K. 2013. *The role of agricultural technical and vocational education and training in developing countries: A review of literature, issues and recommendations for action.* USAID InnovATE Project. USAID, Washington, DC. https://innovate.cired.vt.edu/wp-content/uploads/2015/08/ATVET-CCS-Kristal-Jones-11-12-2014.pdf

Khisa, G. 2003. Self-financing farmer field schools. In: Farmer field schools: The Kenyan experience. Report of the farmer field schools stakeholders' forum, 27 March 2003, Nairobi, Kenya.

Kiptot, E., Franzel, S., Nora, C. & Steyn, A. 2019. Edutainment television for disseminating information about agricultural technology. *In*: Davis, K., Bohn, A., Franzel, S., Blum, M., Rieckmann, U., Raj, S., Hussein, K. & Ernst, N. (eds) What works in rural advisory services? Global Good Practice Notes. Lausanne, Switzerland: GFRAS. www.g-fras.org/en/gfras/1040-what-works-in-rural-advisory-services.html

Kiptot, E., Franzel, S., Nzigamasabo, P.B. & Ruganirwa, C. 2016. *Farmer-to-farmer extension of livestock feed technologies in Rwanda: A survey of volunteer farmer trainers and organizations.* ICRAF Working Paper No. 221. Nairobi, World Agroforestry Centre. DOI: http://dx.doi.org/10.5716/WP16005.pdf

Kirui, J., Franzel, S., Kiptot, E., Kugonza, J., Ongadi, P.M., Wambire, R., Nanjekho, S.W., Karanja, E., Nzigamasabo, P.B. & Ruganirwa, C. 2016. *The Volunteer Farmer-Trainer Extension Approach: A User Guide. Technical Manual.* World Agroforestry Centre, Nairobi. http://dx.doi.org/10.5716/TM16068.pdf

Kumar, A., Kumar, A. & Kumar, M. 2021. *Investing in women livestock advisers and farmers – Jharkhand Opportunities for Harnessing Rural Growth Programme in India.* Rome, FAO and IFPRI. https://doi.org/10.4060/cb7116en

Maguire, E., Bell, M. & Crump, A. 2015. *Agricultural call centers: An infrastructure and demand audit.* Champagne-Urbana, IL, USAID. https://meas.illinois.edu/wp-content/uploads/2015/04/MEAS-EVAL-Esoko-Call-Center-Aug-2015.pdf

Matras, F., Sidi, F. & Treinen, S. 2013. *Exchange visits: Advice for improving the impact. Knowledge management and gender. Good Practice fact sheet.* Rome, FAO. www.fao.org/docrep/019/aq213e/aq213e.pdf

McNamara, P. 2020. *Economic evaluation of agricultural human capital investments: Challenges and approaches.* FAO [unpublished].

MEF (Ministry of Economy and Finance, Government of Peru). 2019. Anexo 11. Parámetros de evaluación social. www.mef.gob.pe/contenidos/inv_publica/anexos/anexo11_directiva001_2019EF6301.pdf

Mondelêz International. 2017. *Exploring a new model of farmer engagement: From training to coaching.* Chicago, Mondelez International. www.idhsustainabletrade.com/uploaded/2017/04/From-training-to-coaching_Mondelez-Ecom.pdf

Myers, B. & Jones, L. 2004. *Effective use of field trips in educational programming: A three stage approach.* Institute of Food and Agricultural Sciences. Gainesville, University of Florida. http://edis.ifas.ufl.edu/wc054

Naruka, P.S., Shilpi, V., Sarangdevot, S.S., Pachauri, C.P., Shilpi, K. & Singh, J.P. 2017. A study on role of WhatsApp in agriculture value chains. *Asian Journal of Agricultural Extension, Economics and Sociology,* 20(1): 1-11 https://journalajaees.com/index.php/AJAEES/article/view/27473

NEPAD (New Partnership for Africa's Development). 2013. *Review of agricultural technical and vocational education and training in Africa: Best practices from Benin, Ethiopia, Namibia and Sierra Leone.* Planning and Coordinating Agency, Midrand, South Africa, NEPAD. www.nepad.org/publication/review-of-agricultural-technical-vocational-education-and-training-atvet-best

Neza, B.N., Higiro, J., Mwangi, L.W. & Ochatum, N. 2021. *Institutionalizing farmer field schools – Twigire Muhinzi national extension system in Rwanda.* Rome, FAO and IFPRI. https://doi.org/10.4060/cb7131en

Nkonu, M. 2014. *Guidelines for agricultural call centers.* London, Global System for Mobile Communications. www.gsma.com/mobilefordevelopment/wp-content/uploads/2014/08/Guidelines-for-Agri-Call-Centres.pdf

Odubote, K., Mulila-Mitti, J., Ajayi, O. & Kadzamira, M. 2019. Seed fairs: an innovative climate-smart practice to obtain stress-tolerant seeds. Wageningen, Netherlands, CTA. www.cta.int/en/blog/all/article/seed-fairs-an-innovative-climate-smart-practice-to-obtain-stress-tolerant-seeds-sid0a92f1424-a108-40de-b61d-4db397fe8544

Olorunfemi, O.D. & Oladele, O.J. 2018. Knowledge of extension agents regarding professionalization of extension services: Evidence from South West Nigeria. *Journal of International Agricultural and Extension Education.* 25:3:33-49.

OMB (Office of Management and Budget, Government of the United States of America). 1992. Circular A-94 Guidelines and Discount Rates for Benefit-Cost Analysis Of Federal Programs. www.wbdg.org/FFC/FED/OMB/OMB-Circular-A94.pdf

Rao, S. 2019. Using radio in agricultural extension. *In:* Davis, K., Bohn, A., Franzel, S., Blum, M., Rieckmann, U., Raj, S., Hussein, K. & Ernst, N. eds. What works in rural advisory services? Global Good Practice Notes. Lausanne, Switzerland: GFRAS. www.g-fras.org/en/gfras/1040-what-works-in-rural-advisory-services.html

Reddy, M.N. & Swanson, B.E. 2006. Strategy for up-scaling the "ATMA" model in India. Paper presented at the 22nd Annual Conference Proceedings of the Association for International Agricultural and Extension Education, Clearwater Beach, Florida, USA.

Salcedo Du Bois, R. & Arca Zimmermann, A. 2021. *Investing in rural households through community promoters: The Haku Wiñay/Noa Jayatai Programme in Peru.* Country Investment Highlights No. 3. Rome, FAO and IFPRI. https://doi.org/10.4060/cb5744en

Scheer, J. & Ariko, J. 2019. *Village agent model study: Likely effect on the Ugandan agricultural sector. Developing Local Extension Capacity Project.* Washington DC, USAID. www.agrilinks.org/sites/default/files/resources/dlec_village_agent_model_study.pdf

Sen, A. 1992. *Inequality reexamined.* New York, Russell Sage Foundation.

Sylvester, G., Davis, K., Gammelgaard, J. & Preissing, J. 2021. *Smart farmers – Learning with digital technologies*. Investment brief. Rome, FAO and IFPRI. https://doi.org/10.4060/cb7947en

Takamgang, M. F. & Lhoste, F. 2021. *Investing in youth vocational training professional training programme in the agropastoral and fisheries sectors in Cameroon.* FAO Investment Centre. Country Investment Highlights No. 11. FAO, Rome. https://doi.org/10.4060/cb7819en

Technoserve. 2012. *The coffee initiative: Lessons learned.* Washington DC, Technoserve. www.technoserve.org/resources/lessons-learned-the-coffee-initiative-2008-to-2011

United Nations. 2021. Secretary-General's Chair Summary and Statement of Action on the UN Food Systems Summit. www.un.org/en/food-systems-summit/news/making-food-systems-work-people-planet-and-prosperity

United Nations Development Group. 2021. *Results-based management handbook. Harmonizing RBM concepts and approaches for improved development results at country level.*

UNCDF (United Nations Capital Development Fund). 2020. *Digital extension services improve farm productivity.* New York, United Nations Capital Development Fund. www.uncdf.org/article/6617/farmer-call-centre-and-digital-extension-agents-delivering-extension-and-agronomic-services-in-uganda

van Coller-Peter, S. & Cronje, J.P. 2020. The contribution of coaching and mentoring to the development of participants in entrepreneurial development programmes, *International Journal of Evidence-based Coaching and Mentoring* 18 (2) 51-67 DOI: 10.24384/bg74-fc70

Van Mele, P., Okry, F., Wanvoeke, J., Barres, N.F., Malone, P., Rodgers, J., Rahman, E., Salahuddin, A. 2018. Quality farmer training videos to support South–South learning. Barres3 CSIT 6(3–4):245–255. https://doi.org/10.1007/s40012-018-0206-z

Waddington, H. & White H. 2014. *Farmer field schools: From agricultural extension to agricultural education. Systematic Review.* London, International Initiative for Impact Evaluation.

Wambugu, C., Franzel, S., Tuwei, P. & Karanja, G. 2001. Scaling up the use of fodder shrubs in central Kenya. *Development in Practice* 11:4.

Wellard, K., Rafanomezana, J., Nyirenda, M. 2013. A review of community extension approaches to innovation for improved livelihoods in Ghana, Uganda and Malawi. *J. Agric. Educ. Ext.* 19(1):21–35.

Wordofa, M. G, & Sassi, M. 2018. Impact of farmers' training centres on household income: Evidence from propensity score matching in Eastern Ethiopia. *Social Sciences* 7, no. 1: 4. https://doi.org/10.3390/socsci7010004

World Bank. 2019. *The changing nature of work. World Development Report* 2019. Washington, DC. The World Bank.

World Bank. 2020. *Nutrition smart agriculture: When Good Nutrition is Good Business.* [online]. www.worldbank.org/en/topic/agriculture/publication/nutrition-smart-agriculture-when-good-nutrition-is-good-business

World Bank. 2021. *Fuelling an engine of sustainable growth: agricultural innovation in Peru.* Results Briefs. www.worldbank.org/en/results/2021/11/04/fueling-an-engine-of-sustainable-growth-agricultural-innovation-in-peru

Glossary

Concept/Term	Definition	Reference
Agriculture human capital	The skills and capabilities of small-scale agricultural producers to successfully manage agricultural enterprises.	Davis *et al.*, 2021
Agriculture human capital development method	A systematically applied technique to provide information, knowledge, advice, skills, training, education and other services to producers and to facilitate problem-solving and learning.	David and Cofini, 2017
Agriculture human capital investment	Policies and investment actions which focus on improving skills, capacities, and capabilities of agricultural producers with the idea that this will provide increased income, productivity, access to markets, social capital, and economic, environmental, and social returns to individuals and society.	
Business skills	Expertise and abilities relating to farming as a business including planning, recordkeeping, marketing, finance and budgeting.	Davis *et al.*, 2021
Capability	The ability to perform certain basic functions in life.	Sen, 1992
Capacity	The ability of people, organizations and society as a whole to manage their affairs successfully.	Organization for Economic Cooperation and Development/ Development Assistance Committee (OECD/DAC) as cited in FAO Corporate Development Strategy
Education	Expertise in a discipline by undergoing systematic instruction and learning, especially at a school or university.	Davis *et al.*, 2021
Empowerment	A process that increases the capacity of people to make choices and influence collective decisions towards desired actions.	Danida, 2004
Functional skills	Social capabilities relating to communication, leadership, public speaking, conflict resolution and empowerment.	Davis *et al.*, 2021
Human capital	The skills, knowledge, ability to work and enjoy good health that together enable people to pursue different livelihood strategies and achieve their livelihood objectives; from an economic perspective, this refers to assets that improve individual productivity and produce economic value.	DFID, 1999; Goldin, 2014
Impact	Wider socioeconomic effects resulting from the change in behaviour, which may entail changes in productivity and incomes, but also more intangible impacts such as changes in health and well-being.	Davis *et al.*, 2021
Input	Activities associated with implementing a given AHCI model such as training or workshops, based on project design strategies	Davis *et al.*, 2021
Internal rate of return (IRR)	The rate of return on an investment adjusted to the times that receipts and expenditure occur, the discount rate makes the net present value of an investment equal to zero.	FAO, 2022b
Investment	Accumulating assets that generate increased income or other benefits in the future.	FAO, 2012

Concept/Term	Definition	Reference
Key performance indicators	A performance indicator specifies what is to be measured along a scale or dimension but does not indicate the direction or change. It is a qualitative or quantitative means of measuring an output or outcome, to gauge the performance of a programme or investment.	United Nations Development Group, 2021
Knowledge	Theoretical or practical understanding of a subject through an active learning process.	
Model of AHCI	Overlapping components (target group, skills providers, agriculture human capital development method, type of human capital, implementers, funders) that make up an agriculture human capital development project or programme.	Davis *et al.*, 2021
Net present value (NPV)	Derived by discounting the net benefit stream by a factor equal to the estimated opportunity cost of capital.	Financial and economic analysis, FAO Investment Learning Platform
Networking	Ability to link with people or entities that affect their well-being such as input suppliers, off-takers, government agencies, and financial services.	
Outcome	Actions and behaviours adopted by the target group from new or developed human capital.	Davis *et al.*, 2021
Output	Changes in the stock of agriculture human capital among the target group.	Davis *et al.*, 2021
Skills	Expertise often occupation-based and focused on competencies for economic value, may be technical, functional or business-related.	Davis *et al.*, 2021
Social capital	Ability to strengthen trust and cohesion with others through groups, networks and associations to achieve social and development outcomes.	DFID, 1999
Technical agricultural skills	Expertise and abilities relating to practices that improve incomes and livelihoods while protecting and minimizing harm to the environment.	Davis *et al.*, 2021
Training	Training imparts a special skill, often at occupational level.	Davis *et al.*, 2021

Annex

Economic and financial analysis: National Agricultural Innovation System Support Project (Peru, USD 174.04 million; World Bank: USD 40 million; Inter-American Development Bank (IDB): USD 40 million; other funders: USD 94.04 million).

Analytical approach

The cost-benefit study included both financial analysis using actual market prices inclusive of taxes, subsidies, and other distortions, as well as economic analysis using economic prices adjusted in some instances to correct for taxes, subsidies, and other distortions in the Peruvian economy. This analysis was designed to estimate standard measures of project worth including net present value (NPV), financial and economic internal rates of returns, benefit/cost ratio, payback period, and incremental benefits per beneficiary in terms of present value. These indicators were estimated: (i) for the overall project; (ii) by project components; (iii) by subproject type; (iv) by commodity grouping/value chain; and (v) by type of training provided to extension and research agents. Sensitivity analysis explored the likely impacts of possible changes in key variables such as benefits, costs, technology adoption rate, training days, success training rate, social discount rate, and evaluation period.

A. IDENTIFICATION OF INCREMENTAL PROJECT COSTS AND BENEFITS

The ex post cost-benefit analysis considered incremental costs and benefits attributable to the project, identified based on activities taking place during it as well as developments expected to occur in future years, as reflected in the theory of change. The main expected incremental costs and benefits for each type of subproject and activity, organized by the Project components, are summarized in Table A.1.

Table A.1
Expected incremental costs and benefits for each type of subproject and activity

Subprojects/activities	Benefits/costs
Component 1. Strengthening the capacity of INIA to lead the National System of Agriculture Innovation (SNIA)	
Incremental benefits were not identified for Component 1, since it is assumed activities implemented under this component aim to create the enabling institutional capacities and regulatory conditions whose direct and indirect benefits are reflected in those generated by activities financed under Components 2 and 3. Costs associated with implementing Component 1 were included in the overall cost-benefit analysis as part of total project costs.	
Component 2. Consolidating the market for innovation services	
Adaptive research subprojects	Benefits: Increased revenues due to higher yields, increased production, improved quality, reduced losses, and/or increased prices Costs: Labour (60 percent of total cost), tradable goods and services used as production inputs (40% of total cost) Labour characterized as: (i) low skilled (extension subprojects); or (ii) semi-skilled (adaptative research subprojects, seed enterprise pilots)
Extension subprojects	
Seed enterprise pilots	
Component 3. Strategic capacities in the SNIA	
Strategic research subprojects	Benefits: Increased revenues are projected for future innovation adopters, plus increased incomes of researchers directly involved in implementing strategic research subprojects. Costs: Increased labour and input costs are projected for future adopters of innovations. Note: It is assumed innovations developed by strategic research subprojects will be adapted and then disseminated using the same mechanisms found in adaptive research and extension subprojects.
Capacity building subprojects	Benefits: Increased income for extensionists after receiving training during the project through capacity-building subprojects Costs: The opportunity cost of training, calculated as income foregone during participation in capacity-building subprojects
Scholarships and internships	Benefits: Increased income for agricultural professionals as a direct result of the training Costs: The opportunity cost of graduate study or internship, calculated as income foregone during participation in a graduate programme or internship

SOURCE: Authors, based on World Bank. 2021. Implementation Completion and Results Report (ICR). https://documents1.worldbank.org/curated/en/399891636578418140/pdf/Peru-National-Agricultural-Innovation-Project.pdf

B. KEY ASSUMPTIONS AND PARAMETERS

All cash flows were estimated using nominal prices. The exchange rate for converting soles to US dollars was determined considering the annual average value prevailing during the project. For baseline scenarios, the cost of capital was set at 10.5 percent and the social discount rate at 8 percent, with an evaluation period of 10 years. The factors used to convert market prices to social prices were those stipulated by the Peruvian public investment system: (i) currency: 1.08; (ii) tradable goods: 0.867; (iii) investment: 0.83; (iv) operating costs: 0.8475; (v) skilled labour: 0.81; (vi) semi-skilled labour: 0.665; and (vii) unskilled labour: 0.5. Positive externalities generated by the project, such as technology spillovers and environmental and social benefits, were not included in the analysis due to the complexity quantifying them and limited information.

C. DATA SOURCES, SAMPLING STRATEGY, AND DATA ANALYSIS

The *ex post* cost-benefit analysis relied on information from three sources: (i) a survey of 70 collaborative subprojects randomly selected from among the 541 subprojects financed using the competitive grants mechanism; (ii) a survey as part of the independently conducted final impact evaluation of 190 researchers and extension agents who benefited from capacity strengthening financed by the project; and (iii) project records. The survey instruments included questions designed to allow comparison of "with project" and "without project" scenarios. For every subproject, data were collected on yields, production volume, and the value of sales, prices paid and received, production costs, and other variables. The data collected at subproject level were supplemented with information taken from the project records to aggregate subproject level results to the overall project level, including the total number of subprojects financed, direct and indirect investment costs, the project implementation period, technology and adoption rates.

The streams of costs and benefits associated with collaborative subprojects and strategic research subprojects, were adjusted to reflect average implementation periods for each type of subproject, and the associated technology adoption rates estimated by surveying participants. The results are presented in Table A.2.

Table A.2
Technology adoption rates from the participants' survey

	Funding cycle			
Subproject type	2015 (year 1) (n = 154)	2016 (year 2) (n = 156)	2017 (year 3) (n = 156)	Total (n = 466)
Adaptative research (n = 100)	37.5	75.3	59.3	64.2
Extension (n = 320)	87.2	77.6	79.8	79.9
Seed enterprise pilots (n = 46)	53.8	95.1	90.0	86.2
Total (n = 466)	77.1	79.1	73.9	76.7

SOURCE: Authors, based on World Bank. 2021. Implementation Completion and Results Report (ICR). https://documents1.worldbank.org/curated/en/399891636578418140/pdf/Peru-National-Agricultural-Innovation-Project.pdf; and World Bank. 2021. Fueling an Engine of Sustainable Growth: Agricultural Innovation in Peru. Results brief. www.worldbank.org/en/results/2021/11/04/fueling-an-engine-of-sustainable-growth-agricultural-innovation-in-peru.

Technology adoption rates were estimated by subproject typologies as those for practices and technologies are not exclusively for a crop (crop rotation/association). It means farmers adopt technologies for different activities: soil preparation, integrated pest management or post-harvest practices. The ex ante EFA analysis considered only some crops, the real demand was completely different.

Likewise, cash flows associated with capacity-building subprojects and scholarships and internships were adjusted based on data collected through the survey of extensionists and researchers on the duration of training activities and the success rate.

RESULTS

Table A.3
EFA indicators: overall project

Financial indicators				
FNPV (USD million)	FIRR (percent)	Benefit/cost ratio	Payback period (years)	Incremental NPV per beneficiary (USD)
48.2	24.6	1.26	7.3	1121
Economic indicators				
ENPV (USD million)	EIRR (percent)	Benefit/cost ratio	Payback period (years)	Incremental NPV per beneficiary (USD)
86.2	31.2	1.48	6.8	2007

SOURCE: Authors, based on World Bank. 2021. Implementation Completion and Results Report (ICR). https://documents1.worldbank.org/curated/en/399891636578418140/pdf/Peru-National-Agricultural-Innovation-Project.pdf; and World Bank. 2021. Fueling an Engine of Sustainable Growth: Agricultural Innovation in Peru. Results brief. www.worldbank.org/en/results/2021/11/04/fueling-an-engine-of-sustainable-growth-agricultural-innovation-in-peru.

Table A.4
EFA indicators: capacity-building component

Financial indicators					
	FNPV (USD million)	FIRR (percent)	Benefit/cost ratio	Payback period (years)	Incremental NPV per beneficiary (USD)
Capacity-building subprojects	1 996 224	22.0	1.44	6.5	1639
Scholarships and internships	1 661 439	20.3	1.33	8.3	4774
Economic indicators					
	ENPV (USD million)	EIRR (percent)	Benefit/cost ratio	Payback period (years)	Incremental NPV per beneficiary (USD)
Capacity-building subprojects	2 836 261	23.9	1.65	6.5	2329
Scholarships and internships	2 496 187	21.9	1.51	7.4	7173

SOURCE: Authors, based on World Bank. 2021. Implementation Completion and Results Report (ICR). https://documents1.worldbank.org/curated/en/399891636578418140/pdf/Peru-National-Agricultural-Innovation-Project.pdf; and World Bank. 2021. Fueling an Engine of Sustainable Growth: Agricultural Innovation in Peru. Results brief. www.worldbank.org/en/results/2021/11/04/fueling-an-engine-of-sustainable-growth-agricultural-innovation-in-peru.

©Pexels/Thor Garian ©FAO/Ezequiel Becerra

Investing in farmers – or agriculture human capital – is crucial to addressing challenges in our agrifood systems. A global study carried out by the FAO Investment Centre and the International Food Policy Research Institute (IFPRI), with support from the CGIAR Research Program on Policies, Institutions, and Markets (PIM) and the FAO Research and Extension Unit, looks at agriculture human capital investments, from recent trends to promising initiatives. This toolkit aims to provide investors including policymakers, government officials, international and national development banks and the private sector, with the evidence, analysis, guidance and processes to make sounder investment decisions on projects, programmes and policies that strengthen farmers' capacities. This publication is part of the Investment Toolkits series under the FAO Investment Centre's Knowledge for Investment (K4I) programme.

ISBN 978-92-5-137662-1

9 789251 376621

CC4381EN/1/03.23