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Making Markets Work Better for the Poor


# Making Value Chains Work Better For The Poor

## A Toolbook for Practitioners of Value Chain Analysis

**4th Edition**

Dominic Smith, Rodd Dyer and Tiago Wandschneider (Eds.)

ACIAR Monograph No. 212

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**Cover image:** A vegetable retailer in Hanoi selling chayote produced by ethnic minority farmers in Hoa Binh province, northern Vietnam.
**Photo:** ©2009CIAT/NeilPalmer

# Foreword

This Toolbook has been created by the concerted efforts of many people over more than a decade. Currently in its fourth edition, substantial updates have been made since 2005 ,when this toolbook was first created.

The first edition of the toolbook was written by Dominic Smith and Luigi Cuna in 2005 as part of the Making Markets Work Better for the Poor (M4P) Project, supported by DFID and implemented by ADB in Vietnam, Laos and Cambodia. This Toolbook was used as a resource for undertaking some early value chain studies in Vietnam under the M4P project and for informing cross-cutting thematic studies in the value chain practice area.

The M4P project subsequently supported the collaborative development of a second edition of the toolbook in 2006, with inputs from a group of contributors/editors from a diverse range of organisations, including Netherlands Development Organisation (SNV), International Labour Organisation (ILO), Royal Tropical Institute (KIT), Fresh Studio and the Asian Development Bank (ADB). The second edition was largely developed during a writeshop held in Sapa in Northern Vietnam.

The third edition of the toolbook was developed through a writeshop process undertaken in Dalat, in the central highlands of Vietnam in early 2008 with a core group of collaborators/editors and also benefited enormously from the contribution of a network of almost 100 collaborators from around the world who contributed to an online wikibook update of the toolbook. The third edition was published in November 2008 and has since become one of the most widely used value chain toolbooks in the world.

This fourth edition of the toolbook has been developed in order to expand the scope of the Toolbook to include gender and social equity, update the existing chapters of the toolbook taking into account developments in value chain analysis over the past 12 years, to add more practical case studies, and to add a new chapter on data collection methodologies.

The fourth edition of the toolbook has been produced with the support of the Australian Centre for International Agricultural Research (ACIAR) as part of the project AGB/2018/121, Revision and update of Markets for the Poor (M4P) and Agribusiness Master Class implemented by the University of Adelaide. This edition is edited by Dominic Smith, Rodd Dyer and Tiago Wandschneider and includes substantive contributions from Emily Miller, a private sector development and gender specialist and Nozomi Karawazuka, a social scientist and gender specialist from the International Potato Centre. The toolbook has benefited from external review by experienced practitioners acknowledged in the table below. This has also resulted in an enriched set of case studies to illustrate the toolbook. We appreciate your input.

The new edition has been developed in conjunction with a dedicated website **(www.valuechains4poor.net)**, that includes the content of the toolbook, relevant documents, extended case studies and updated discussions.

It is hoped that the updates and additions to this edition of the toolbook mean that it remains a relevant and useful resource for many years to come, especially for development practitioners who wish to analyse and support value chain development with a particular emphasis on improving livelihoods of the poor.

This toolbook is dedicated to the memory of Timothy Purcell (1970-2012) who was the driving force behind the second and third editions of the toolbook and without whose dedication and expertise this toolbook would be a much inferior volume.

***Dominic Smith, Rodd Dyer, Tiago Wandschneider, August, 2020***

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Ethnic minority women from Hoa Binh province, northern Vietnam successfully established a chayote value chain and increased their income.
Photo: ©2009CIAT/NeilPalmer

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# 1. Introduction to the Value Chain Toolbook

# Introduction

The toolbook provides value chain practitioners with an easy-to-use set of tools for value chain analysis, with a focus on poverty, gender, and social inclusion. Although a number of guides for value chain analysis exist, the core aim of this toolbook is to provide robust analytical tools to identify value chain interventions that are inclusive and beneficial to the poor, to both women and men, or to other disadvantaged groups. Women are often invisible in formal value chain systems. Without careful consideration of women's roles and their unpaid labour contribution within the household and across value chains, women's voices can easily be ignored or excluded. Therefore, more attention in this revised toolbook edition is paid to the inclusion of women, as well as socially disadvantaged groups.

Collecting forage for livestock near Kampong Cham, Cambodia. ©2009CIAT/NeilPalmer



Focus Group Discussion with women farmers about upgrading cassava planting methods in Kampong Cham province, Cambodia. Photo: ©2015CIAT/Georgina Smith

## Who Should Use the Toolbook?

The toolbook is designed as a practical manual to be used in the field by anyone involved in project research, development, or identification of sector investment opportunities. The focus is on providing easy-to-follow tools and clear explanations about their use. This includes examples of how these tools can and have been used in value chain analyses in the past. Although the value chain theory that underpins the tools presented in the toolbook is an important element, the practical aspects of analysis dominate the content.

The toolbook is developed for field-based researchers and practitioners. It will also help policy makers and planners understand how markets can be organised, and how they can support the development of value chains in a way that improves the position of the poor, smallholder farmers, small-scale agri-enterprises, or disadvantaged groups. The principles presented in this guide can also help policy makers identify which value chains and sectors to support. It is assumed that toolbook users want to develop competitive value chains that are more inclusive, that create opportunities for more people to participate in markets and produce benefits from increased income and employment opportunities. Therefore, interventions developed using the analytical tools in this guide should have a clear focus on improving the livelihoods of the poor, women, or otherwise disadvantaged groups.

## Organisation of the Toolbook

The toolbook is organised into two main sections.

**The first section** gives a theoretical background to value chains, explains the pro-poor and inclusive entry points for value chain analysis described in this toolbook, and outlines a broad set of key methods and approaches that are used for gathering data and information necessary to undertake value chain analyses.

**The second section** contains eight practical tools that can be used to analyse different dimensions within value chains.

The first two are general tools: value chain selection and mapping of value chains. These are followed by two qualitative tools to analyse governance and linkages, power and trust in the value chain. Three quantitative tools then follow, to analyse costs and margins, income distribution, and employment distribution. The final tool integrates both qualitative and quantitative data from the previous tools to systematically identify opportunities for upgrading. Information about applying a pro-poor, gender, and social inclusion lens is integrated throughout the value chain analysis tools as a cross-cutting theme, rather than being the subject of a separate tool.



Specific examples of how different value chain analysis tools appear in the text as boxes. Select case studies of best practices in value chain analysis and follow-up interventions have been included in the annexes to the manual and on the associated website, demonstrating the impact of the interventions chosen. Terminology and definitions, information worth noting, things to watch out for, and some useful tips are highlighted with the following icons:


Terminology


Take note


Warning


Try this


Terminology

**Dimension** in this toolbook means an area of interest or focus for the analysis. For example, a specific dimension targeted in this toolbook is the participation of the poor, women, and socially disadvantaged groups.

## How to Use the Toolbook?

Prioritising Value Chains (Tool 1) and Mapping the Value Chain (Tool 2) are often the first logical steps of a value chain study. Similarly, identifying Options for Upgrading (Tool 8) is generally the final objective and end-point of a value chain study. However, the tools do not have to be used sequentially from Tool 1 through 8. Instead, users can draw on the analytical tools and approaches that best meet their specific needs. Depending on the main interests, the time available for analysis, and the experience with value chain work, some tools may be used in preference, or more intensely than others.

Table 1 shows various dimensions of value chain analysis and the tools that could be utilised to analyse those dimensions. The relevance of each tool to a specific dimension is indicated by the

number of ticks; the greater the number of ticks (to a maximum of three ticks), the more relevant the tool is for analysing that particular dimension.

Having various tools available to analyse value chains does not mean that all the tools should be used every time. The choice of tools to be used (general, qualitative and/or quantitative) will depend largely on the scope and objective of the analysis itself. This is often dictated by financial or time constraints, or other limitations. Value Chain Mapping (Tool 2) is generally used as a minimum in any value chain analysis, with other tools being used to bring in more detail and to provide a "reality check" on the results of the initial mapping.

**Tools for analysing next page**



**Table 1. Tools for analysing various dimensions of the value chain. The eight tools presented in the toolbook relate more closely with some dimensions than others, as indicated by one, two, or three ticks for that association**

| | GENERAL TOOLS | | QUALITATIVE TOOLS | | QUANTITATIVE TOOLS | | | Mixed |
|---|---|---|---|---|---|---|---|---|
| | TOOL 1 | TOOL 2 | TOOL 3 | TOOL 4 | TOOL 5 | TOOL 6 | TOOL 7 | TOOL 8 |
| **Dimensions** | Prioritising Value Chains | Mapping the Value Chain | Governance: Coordination, Regulation, and Control | Linkages, Relationship, and Trust | Analysing Costs and Margins | Analysing Income Distribution | Analysing Employment Distribution | Options for Upgrading |
| **Participation of the poor, women, and socially excluded groups** | √ | √ | √ | √ √ | | √ √ √ | √ √ √ | √√ |
| **Employment and working environment** | √ | √ | √ | | √ | √ | √ √ √ | √√ |
| **Wages and income** | √ | √ | √ | | √ √ | √ √ √ | √ | √√ |
| **Access to assets** | √ | √ | | √ | √ | | | √√√ |
| **Access to information and technology** | √ | √ | √ √ √ | √ √ | √ | | | √√√ |
| **Access to infrastructure** | √ | √ | √ √ | | | | √ | √ |
| **Access to services** | √ | √ | √ √ | √ √ | | | | |
| **Security and vulnerability** | √ | √ | √ √ | | √ | √ √ | √ √ √ | |
| **Empowerment** | √ | | √ √ | √ √ √ | | | | √√ |

Technical support helps ethnic minority farmers in Van Ho district, northern Vietnam to develop safe-vegetable value chains to new markets in Hanoi. ACIAR/Vietnam

# 2. Value Chain Concepts

# From Pro-poor to Gender and Social Inclusion

The entry point and orientation of the first three editions of this toolbook were focused specifically on **making value chains work better for the poor**. Pro-poor elements were included as cross-cutting themes throughout the guide. In this revised fourth edition, the "pro-poor" focus has been extended to better cover gender and social inclusion. Therefore, the cross-cutting theme of the toolbook is **"making value chains more socially inclusive"**.

In *Innovation for Inclusive Value-Chain Development*, Devaux et al.[1] present updated concepts and frameworks for designing, implementing, and evaluating strategies for promoting pro-poor innovation in value chains. Their recommendations for improving the application of a "gender lens" in value-chain interventions and developing methods for implementing asset-based approaches were important motivations for the revisions in this guide.

Improving cassava cultivation techniques improves income and livelihoods of farming families in Kampong Cham province, Cambodia.
Photo: ©2015CIAT/GeorginaSmith



The latest edition provides a set of tools for analysing agricultural value chains and market systems and identifying promising chain development opportunities and interventions. However, with the added emphasis on gender equality and social inclusion, the updated tools are oriented more toward analysing the situation, roles, and entry points for the poor, women, and disadvantaged groups, such as ethnic minorities. The FAO (2018) notes that these groups face constraints that limit their participation in, and benefits from, value chains. Simultaneously, those constraints undermine the overall performance of the chain by generating distortions in the labour market, losses, and inefficiencies[2].

Inclusive value chain analysis recognises formal and informal institutions and, embedded in these institutions, the power relations that disempower women, the poor, the vulnerable, and the disadvantaged. A gender equality and social inclusion framework supports the economic and social empowerment of women and the socially disadvantaged, promoting improved competitiveness, market access, and income for those groups.

Enhancing competitiveness, generating income and employment, and creating value are key performance measures of value chain development when the primary goal is economic growth and market development. However, if this is the only focus, millions of poor farmers, workers, and micro- and small-medium agri-enterprise (MSMEs) owners who dominate agricultural value chains in developing countries may benefit little, or even be excluded, from participating in specific value chains. Additionally, the impacts on women, ethnic minorities, and other disadvantaged groups less visible in these chains, may be completely overlooked.

Value chain development can contribute significantly to reducing poverty and improving livelihoods. However, to achieve these goals, value chain analysis should focus more on understanding the social livelihood context, and how and where benefits are generated and distributed. Value chain frameworks and methodologies are sufficiently flexible that analyses can be targeted to certain groups of actors in the chain, or in different geographies or sectors.

1. A Devaux et al., *Innovation for Inclusive Value-chain Development: Successes and Challenges,* 1st edn., Washington, DC, International Food Policy Research Institute, 2016.
2. FAO, *Gender Sensitive Analysis of the Value Chain, Part One*, Rome, Food and Agriculture Organization of the United Nations, 2018.

# Gender Equality, Women's Empowerment and Social Inclusion

Women and men have different opportunities, constraints, interests, and capacities. Therefore, it is very important to recognise gender differences within the same social group (e.g. the poor or an ethnic minority) and within the same value chain level (e.g. farming, product collection, wholesaling, or processing). This is a first step to identifying specific challenges and opportunities women or men may face, and developing appropriate interventions targeting specific gender groups.

Applying a gender lens in value chain analysis requires asking some key questions:

- Where are women and men located in the value chain?
- What are women's and men's roles in the value chain?
- Where do women and men indirectly contribute to the value chain by providing unpaid or unrecognised labour?
- Which value chain levels are more likely to provide opportunities for women to benefit?
- Which value chain levels are dominated by men and less likely to provide opportunities for women to benefit, and why?
- What are the main gender-based barriers preventing women and men from benefiting more from the existing value chain? (e.g. norms, time constraints, lack of connections, knowledge and information, finance)

Women street peddlers selling fruit, vegetables and flowers are a common sight in Hanoi, Vietnam. Photo: ©2015CIAT/GeorginaSmith



Government, donor, or lead firm objectives will most often determine the purpose of value chain development. Desired outcomes could include sector development, promoting downstream processing and value adding, increasing export earnings, developing new markets, generating employment, benefiting specific groups in society, or supporting underdeveloped or disadvantaged regions of a country. The entry point, and therefore the focus of the value chain analysis, should be directly related to the desired development outcome.

The degree to which gender and social inclusion is emphasised in value chain analysis will also depend upon the overall programme goals and objectives, geographic/country context, and available development resources. Two approaches are possible:

- An integrated approach where gender and social inclusion is included in all planning phases and processes, is a minimum requirement for gender mainstreaming. That is, economic development programmes are advised to incorporate gender-aware research, analysis, planning, implementation, and monitoring and evaluation; or
- A targeted approach that supplements the integration of gender and social inclusion and contributes to economic empowerment. The intent here is not to isolate women or other marginalised groups from the mainstream, but to utilise targeted strategies to enhance integration efforts over the longer term[3].

Vegetables and fruits sold at road-side markets provide income to women in Mandalay, Myanmar. Photo: Helvetas/NgocAnh

**Box 1. Key concepts and definitions**

**Inclusive value chain development**

Inclusive value chain development can be defined as positive or desirable change in a value chain to extend or improve production operation and generate social benefits; poverty reduction, income and employment generation, economic growth, environmental performance, gender equity, and other development goals[4] .

**Social inclusion**

Closely linked to gender equality and women's empowerment is the concept of "social inclusion", which the World Bank defines[5] as "the process of improving the terms for individuals and groups to take part in society". This includes greater participation in economic opportunities, which in turn lead to reducing poverty and promoting inclusive economic growth. Its opposite, social exclusion, occurs when men and women, or certain groups, confront barriers that prevent them from fully participating in economic systems. Acknowledging this, the United Nations has committed to "leaving no one behind", in an effort to help countries promote inclusive growth and achieve the Sustainable Development Goals (SDGs).

**Gender equality**

Gender equality refers to "the equal rights, responsibilities and opportunities of women and men and girls and boys. Equality does not mean that women and men will become the same but that women's and men's rights, responsibilities and opportunities will not depend on whether they are born male or female. Gender equality implies that the interests, needs and priorities of both women and men are taken into consideration, recognising the diversity of different groups of women and men. Gender equality is not a women's issue but should concern and fully engage men as well as women. Equality between women and men is seen both as a human rights issue and as a precondition for, and indicator of, sustainable people-centered development"[6].

**Women's empowerment**

In this book, women's empowerment is defined as "the process by which those who have been denied the ability to make strategic life choices acquire such an ability"[7]. In this respect, women's empowerment is beyond simply increasing women's incomes through inclusive agricultural value chain, rather to challenge underlying gendered social structures which disadvantage particular social groups because of their gender. Empowerment is, therefore, "transformative when it challenges systemic constraints to the agency of women and girls in multilevel and multidimensional processes of change in social relations (not just individual change)"[8].

3. L. Jones, *Women's Empowerment and Market Systems: Concepts, practical guidance and tools* (WEAMS Framework), The BEAM Exchange, 2016, pp. 7-8, https://beamexchange.org/uploads/filer_public/0d/50/0d5009be-faea-4b8c-b191-c40c6bde5394/weams_framework.pdf.
4. UNIDO, *Pro-Poor Value Chain Development: 25 Guiding Questions for Designing and Implementing Agroindustry Projects*, Vienna, United Nations Industrial Development Organization, 2011, https://www.unido.org/sites/default/files/2011-12/Pro-poor_value_chain_development_2011_0.pdf.
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8. A.V. Eerdewijk et al., *A conceptual model of women's and girls' empowerment*, Amsterdam, KIT Royal Tropical Institute, 2017.



**Box 1. Key concepts and definitions**

**Agency**

This book employs agency as defined by Kabeer as "the ability to define one's goals and act upon them". Kabeer points out that although agency is often interpreted as 'decision-making' in the social science literature, the forms of agency are diverse, including bargaining and negotiation, deception and manipulation, subversion and resistance as well as more intangible, cognitive processes of reflection and analysis. It can be exercised by individuals as well as by collectivities[7]. Individuals' choices are constrained by underlying gendered social organisations that shape gender norms, value, identities, and resource access. Hence women's agency is different from men's along with class, ethnicity, and generation[9].

**Social capital**

Social capital is defined as the institutions, relationships, attitudes, and values that govern interactions among people and contribute to economic and social development[10]. Women and men have different social capital and take different approaches to utilising social capital in agriculture[11].

# Value Chain Concepts

In this toolbook, the **value chain** refers to the full range of processes, activities, and flows required to transform inputs and services into a product from conception, through the different phases of production to delivery to final consumers and disposal after use[12,13].

Value chain approaches consider the complex system of activities and interactions performed **by various direct and indirect actors** (e.g. input suppliers, primary producers, processors, traders, retailers, and service providers) involved in the transformation of inputs and services into a final product for sale.

**Direct actors** are those involved in production, post-harvest, processing, exporting, and marketing of a product within the value chain. Direct actors take ownership of the product at one or more stages in the value chain. **Indirect actors** provide operational and support services to the direct actors at various points across the chain. Indirect actors do not necessarily take ownership of the product at any time. Value chains also operate in a context of **external influences** that include economic, technological, socio-cultural, legal-political, and environmental forces. A stylised value chain map showing the relationships and linkages between direct actors, indirect actors, and external influences and contexts is presented in Figure 1.

9. See for example: N. Kabeer, Gender equality, economic growth, and women's agency: The "endless variety" and "monotonous similarity" of patriarchal constraints, *Feminist Economics*, vol. 22, no. 1, 2016, pp. 295-321.
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11. R. Meinzen-Dick et al., 'Gender and social capital for agricultural development', in: *Gender in Agriculture*, Dordrecht, Springer, 2014, pp. 235-266.
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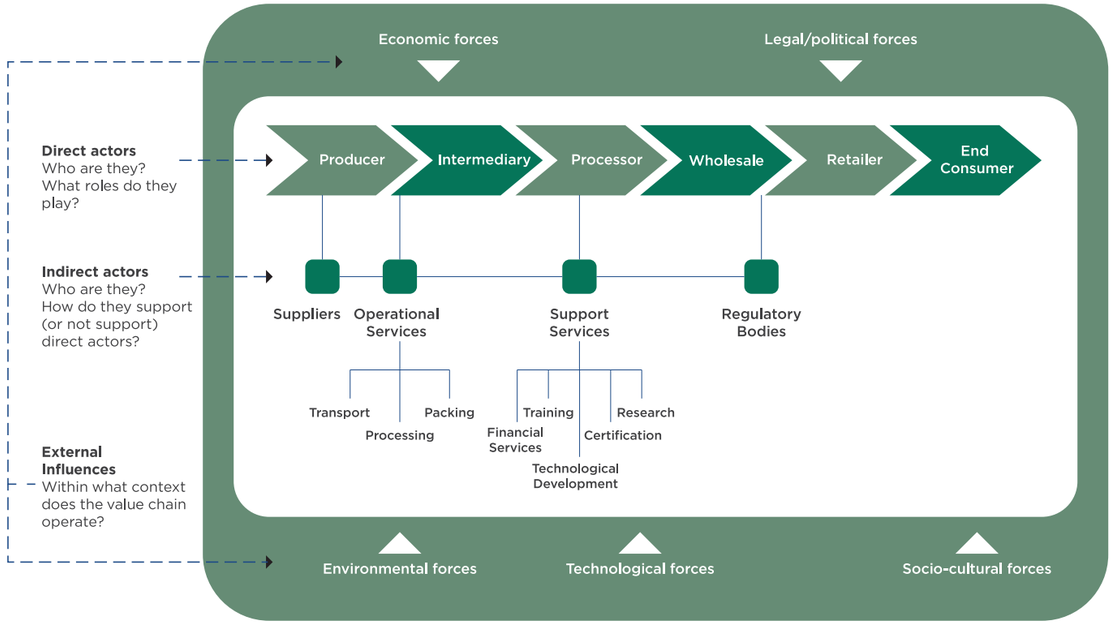



Figure 1. Stylised value chain map showing direct and indirect actors and external influences. Source[14]

A key feature of value chain analysis is the broad approach it takes to understanding the overall market system in which the production, transformation, and consumption of goods takes place. Value chain analysis describes the existing system and context, and enables identification of challenges, problems, and bottlenecks at various points within the value chain. In addition, the researcher can identify potential solutions to problems or constraints across different levels of the value chain for different target groups.

The concepts of value and competitive advantage, based on the research of Michael Porter[15], are fundamental to value chain analysis and development. In simple terms, value represents what the customer believes the product or service is worth to them, and what they may be willing to pay. Price is the amount of money paid for it.

Value is created when the benefits generated across the chain, or at each process level, exceed the costs of creating it. As described by Porter, superior value can be achieved by "offering lower price

14. M. Lundy et al., *LINK methodology: a participatory guide to business models that link smallholders to markets*, version 2.0, Cali, Colombia: International Center for Tropical Agriculture, 2014.
15. M.E. Porter, *The Competitive Advantage: Creating and Sustaining Superior Performance*, NY, Free Press, 1985. (Republished with a new introduction, 1998.)



than competitors for equivalent benefits or providing unique benefits that more than offset a higher price".

With this economic lens, the goal of a value chain therefore is to **create a competitive advantage by delivering the most value for the least cost**. This requires identifying opportunities for improving production efficiency and differentiation across the whole chain. However, it is important to remember that markets are often imperfect, with asymmetries of information and power, lack of transparency, and externalities that can severely disadvantage women and the poor[16]. It is also important to recognise that rural households and the poor don't necessarily act like profit-maximising firms. Instead, their priorities and actions are shaped by a combination of livelihood strategies required to ensure food security, resilience and risk mitigation, income diversification, and off-farm income generation. Therefore, inclusive value chain analysis takes a wider view of the concept of "value" and benefits, to include human, social-cultural, and environmental values.

The establishment or development of value chains may put pressure on natural resources (such as water or land), which produces degradation of the soil, loss of biodiversity, or pollution. These concerns are highly relevant to agricultural value chains because these are critically dependent on environmental resources.

In addition, the idea of a value chain is associated with governance concepts, including organisation, cooperation, and coordination, and power relationships involving direct and indirect actors in the chain. Conducting a value chain analysis requires a thorough investigation of what is going on between the actors in the chain, what keeps them together, what information is shared, and how relationships between actors evolve. These and other relevant issues will be discussed in this toolbook. In particular, the agricultural sector is often characterised by the prevalence of cultural ties and traditional social norms, which may both influence and be affected by the development of value chains. For example, power relationships within households or communities may be modified, or the operations of value chain participants may negatively affect the poorest or most vulnerable groups.

16. L. Jones, *Women's Empowerment and Market Systems: Concepts, practical guidance and tools* (WEAMS Framework), The BEAM Exchange, 2016, pp. 7-8, https://beamexchange.org/uploads/filer_public/0d/50/0d5009be-faea-4b8c-b191-c40c6bde5394/weams_framework.pdf.

# Key Dimensions of Value Chain Analysis

## 1. Mapping

At its most basic level, a value-chain analysis **systematically characterises and maps the processes and actors** participating in the production, distribution, transformation, and sales of a product or products. Mapping describes the characteristics of actors, profit and cost structures, employment, and flows and transformation of products throughout the chain[17]. These details can be gathered from focus groups, key informant interviews, and secondary data. Techniques for mapping the value chain are covered in Tool 2. The items included in a value chain map are explored in more detail in subsequent tools.

While a simple linear chain of direct actors, supplying a product to one market segment, may occur for some value chains, the reality for most value chains is far more complex. There are usually multiple end-markets and product forms, and numerous actors at different stages of the value chain, which need to be mapped.

It is also essential to recognise that farmers, traders, wholesalers, and other actors are not simply homogenous groups. Significant variability usually exists within and between different households, enterprises, and businesses at each level of the chain. Furthermore, the livelihood assets (i.e. the human, natural, social, financial, and physical capital) possessed by smallholder farmers and other groups of actors is a critical factor in determining their ability to participate in, or benefit from, value chains and formal markets[18]. Therefore, understanding the livelihoods strategies and available assets of specific target groups is particularly important for identifying their constraints, as well as suitable opportunities within a value chain.

Constructing an accurate value chain map is vital to build understanding of the operations of the whole system. A map of the value chain for cassava fresh roots, dried chips, and starch in Son La, Vietnam is shown in Figure 2. Accurately mapping these complex systems allows more effective identification of the role of different stakeholders, problems and constraints, opportunities, and solutions.

17. R. Kaplinsky and M. Morris, *A Handbook for Value Chain Research*, Brighton, Institute of Development Studies, University of Sussex, 2001.
18. D. Horton et al., Innovation for Inclusive Value-Chain Development: Highlights, in: A. Devaux et al. (Eds), *Innovation for inclusive value-chain development: successes and challenges*, 1st edn., Washington, DC, International Food Policy Research Institute, 2016, pp. 3-37.



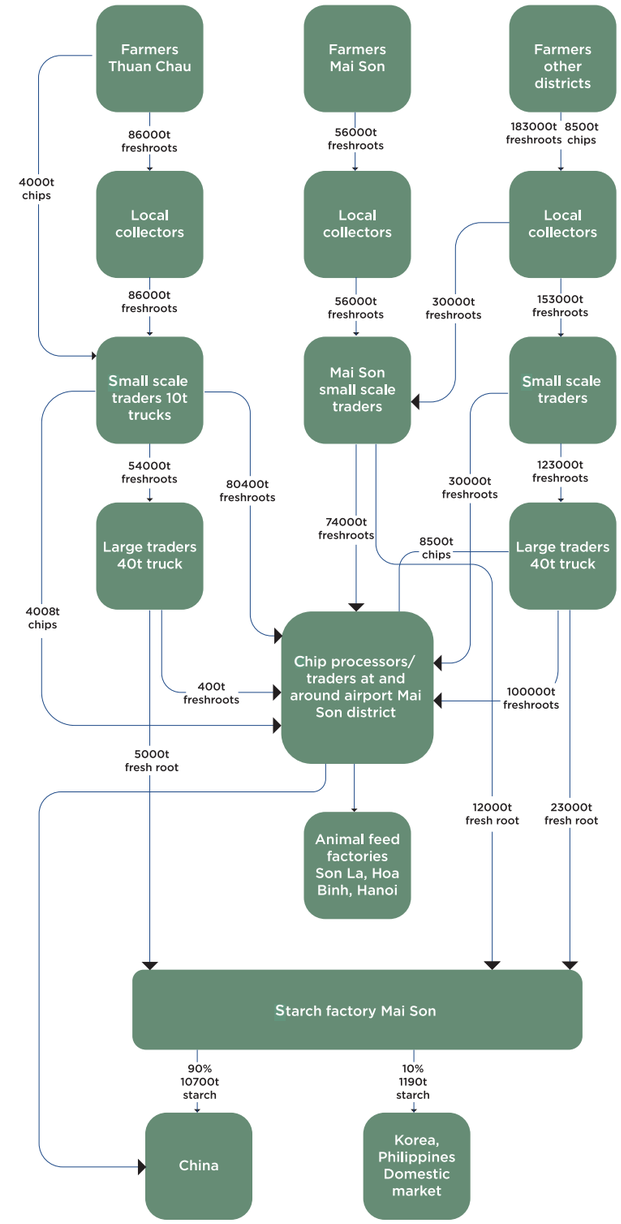



Figure 2. Complex value chain for cassava in Son La (Northern Vietnam) in 2016, with multiple product forms, channels, and end users. Source[19]

19. Pham Thi Sen et al., *Value Chain Analysis, Household Survey and Agronomic Trial Results in Son La, Vietnam*, Cassava Value Chains Program Discussion Paper Number 1, Australian Centre for International Agricultural Research (ACIAR), 2018.

Cassava farmers are trained in improved crop and soil fertility management in Quang Binh, Vietnam. Photo: ©2015CIAT/GeorginaSmith

# 2. Governance

Value-chain analysis **highlights the role of governance and linkages**, i.e. the structure of relationships and formal and informal coordination mechanisms that exist between different actors.

Commercial rules that govern business relationships in global or local value chains are part of internal governance. These rules may constrain or restrict the role of the poor, but may also create important learning and upgrading opportunities. Commercial rules can be very specific (codified), e.g. clearly set and described quality grades of agricultural produce with corresponding transparent prices or pricing formulas.

External governance refers to chain-specific legislation and regulations affecting the chain, as well as standards prescribed by third-party certification systems, such as USDA or EU organic standards, Fairtrade Labelling Organization (FLO) standards, or Rainforest Alliance. External governance by indirect actors is important from a policy perspective, as institutional arrangements may need to be identified and targeted to improve capabilities in the value chain (e.g. research), remedy distributional distortions, and increase competitiveness.

## Social capital

What distinguishes value chain analysis from other approaches is the strong emphasis on understanding social capital and the relationships between participants, organisations, and institutions in the value chain. The broad elements of social capital defined by Grootaert and Bastelaer[20] (Figure 3) are integrated in the value chain concepts and analysis of governance, rules and regulations, relationships, linkages, trust, and power described in Tools 3 and 4.

As shown in Figure 3, two elements or forms of social capital are distinguished. **Structural social capital** is the observable social structures, such as farmer and marketing groups, industry associations and institutions, and the rules and procedures they represent (explored in Tool 3). **Cognitive social capital** refers to more intangible elements, such as generally accepted attitudes and behavioural norms, shared values, reciprocity, and trust (explored in Tool 4). Social capital can also be observed at three levels or scales:

1. The micro-level, in the form of *horizontal networks of individuals and households;*
2. The meso level, which captures *horizontal and vertical relationships among groups, associations, and organisations;* and
3. The macro level, in the form of the *broader institutional and political environment.*



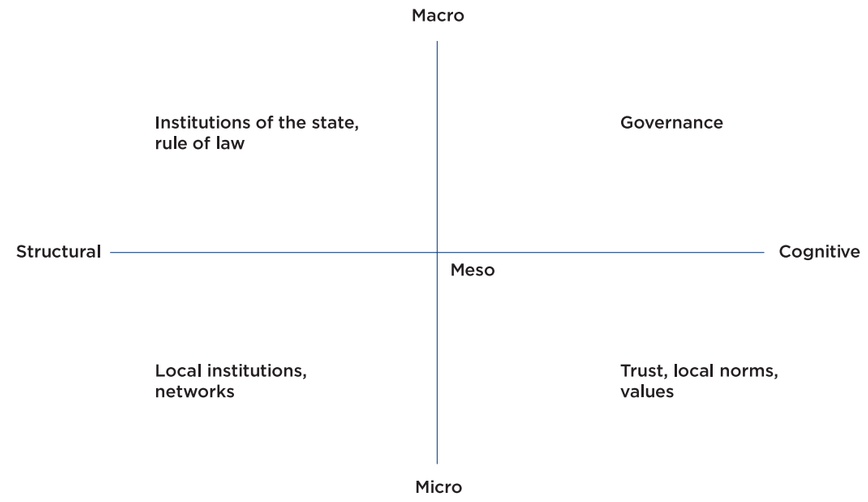



Figure 3. The forms and scope of social capital. Source[20]

## Cooperation and Coordination

Governance ensures that interactions between chain participants are organised, rather than being simply random. This entails varying degrees of cooperation between actors at the same process step (horizontal), or at different process steps (vertical). Generally speaking, governance within the chain occurs when some actors work to criteria set by other actors in the chain, for example; quality standards or delivery times and volumes set by processing industries.

A useful model developed by Daniele Guidi[21] includes cooperation and coordination as key dimensions for describing value chain business models and governance arrangements (Figure 4). **Cooperation** is concerned mainly with greater social goals and equitable distribution along the chain as individuals work together to help one another for mutual benefit. **Coordination** refers to entrepreneurial activities along the chain, so that individual efforts are uniformly organised in pursuit of a competitive business goal. As smallholders move from spot transactions with local traders (i.e. along the vertical axis of cooperation in Figure 4) there is increasing levels of trust, social capital, and information sharing between buyers and sellers. This reduces marketing transaction costs and creates economies of scale.

20. C. Grootaert and T.V. Bastelaer, *Understanding and Measuring Social Capital. A Multidisciplinary Tool for Practitioners*, Washington, D.C., World Bank, 2002.
21. D. Guidi, *Sustainable Agriculture Enterprise: Framing Strategies to Support Smallholder Inclusive Value Chains for Rural Poverty Alleviation*, Working Papers Paper no. 53, Harvard University, Centre for International Development, October 2011.

Stronger coordination between actors of value chain functions i.e. moving along the horizontal coordination axis, has a focus on maintaining competitive advantage and value creation in the market. Increasing contractual arrangements reduce transaction costs for downstream actors, and benefit upstream smallholder farmers through reduced price volatility, market monitoring, and sale negotiations.

The simultaneous development of both cooperation and coordination relationships, shown along the diagonal axis, represents moving towards strong value chain partnerships based on trust and shared goals. However, in reality, governance arrangements tend towards either of the following:

- stronger vertical coordination, with greater power asymmetry and less mutual collaboration (captive models), or
- more collaborative and development-oriented approaches (relational models), but less coordination and less access to the most competitive markets.

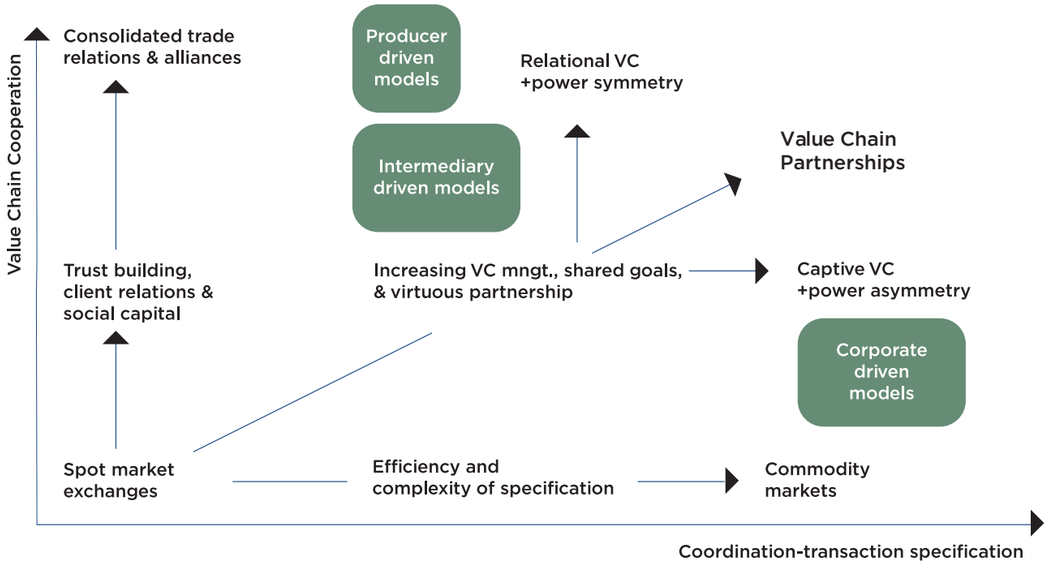



Figure 4. Value chain business models and governance mechanisms



As described by Guidi, a range of different business models between actors can coexist in value chains, each underpinned by different levels of horizontal and vertical coordination and cooperation. These may be more, or less, inclusive or beneficial to target groups. It is very important to note that chains with relatively low levels of coordination and internal and external governance can still be considered "value chains" – products and services are still created, transformed, and consumed, and value is still created by actors along the chain.

In many cases, these value chains could become more efficient or be modified to improve the position of the poor or socially disadvantaged. However, it is also important to recognise that an appropriate and effective method of achieving greater benefits for the poor or socially disadvantaged within a value chain may not always involve improving "linkages" or chain governance. Often, innovation, technology adoption, and capability development will be required to address important technical problems affecting the performance of the value chain, such as plant disease, suboptimal varieties, or poor product storage and packaging.

## 3. Value Chain Upgrading

Value chain analysis can be used to identify opportunities to increase whole-chain efficiency, competitiveness, and value creation that will lead to improved incomes and livelihoods for targeted groups. This is often referred to as chain upgrading. Upgrading can involve improvements in quality and product design, or diversification in the product lines served, potentially allowing producers to generate higher value. Different chain upgrading options are available to farmers, agribusiness firms, and indeed development practitioners[22,23], including:

- process upgrading
- product upgrading
- functional upgrading
- channel upgrading
- inter-chain upgrading

Mitchell et al.[24] added horizontal coordination, vertical coordination, and creating an enabling environment to these upgrading strategies (Figure 5).

22. J Humphrey and H Schmitz, *Developing Country Firms in the World Economy: Governance and Upgrading in Global Value Chains,* INEF Report 61, Institut fur Entwicklung und Frieden der Gerhard-Mercator-Universitat Duisberg, 2002, pp 18-35,https://www.researchgate.net/publication/320427730_Developing_Country_Firms_in_the_World_Economy_Governance_and_Upgrading_in_Global_Value_Chains.
23. USAID, Marketlinks: *Types of Upgrading*, https://www.marketlinks.org/good-practice-center/value-chain-wiki/types-upgrading, (accessed May 2020).
24. J. Mitchell, C. Coles and J. Keane, *Upgrading along value chains: Strategies for poverty reduction in Latin America,* Briefing Paper, Overseas Development Institute, December 2009.

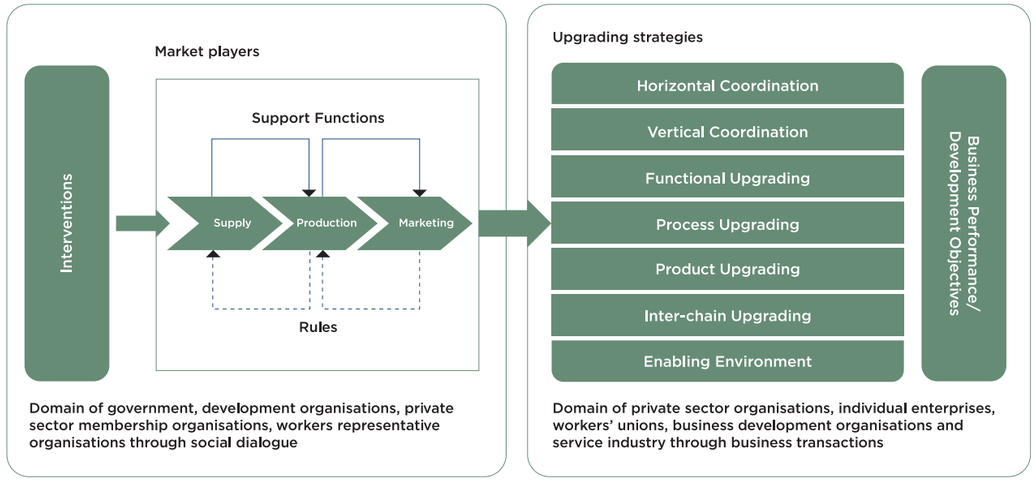



Figure 5. Typology for upgrading strategies. Source[24]

An analysis of the upgrading process includes an assessment of the profitability of actors within the value chain, as well as information on limitations that are currently present. Governance in the value chain plays a key role in defining how such upgrading occurs. In addition, the structure of regulations, entry barriers, trade restrictions, and standards can further shape and influence the environment in which upgrading can take place.

It is important to recognise that a careful analysis of the costs and benefits of upgrading needs to be undertaken to evaluate which upgrading strategies (if any) are appropriate and feasible for the poor and socially disadvantaged. Upgrading strategies using expensive or non-appropriate technologies may well expose producers to significantly higher levels of risk. Similarly, not all farm households are interested or willing to "upgrade" by performing additional functions within the value chain, e.g. becoming collectors or semi-processors. To a large degree, the ability of households to successfully participate in, or benefit from, value chain or upgrading activities will depend on whether their livelihood strategies and assets are aligned with the social, financial, human, and physical capital needs and demands of the chain.



## 4. Distribution of Benefits

Finally, value-chain analysis can play a key role in **identifying the distribution of benefits between actors in the chain**. That is, through the analysis of costs and margins along the chain, it is possible to determine who currently benefits and which actors could potentially benefit from increased support or organisation.

An understanding of the distribution of benefits to different actors throughout the chain is vital for developing strategies for improving the position of the poor and socially disadvantaged. These strategies will differ between value chains, particularly between bulk commodity chains (such as non-specialty rice or hybrid maize) and higher-value chains (e.g for fruits or vegetables).

Within specialised value chains, there is a possibility to increase value by improving the quality of the product or selling it in a higher-value segment of the market. The intervention focus in this case would be to ensure that an equitable share of the value added through the chain accrues to the poor and socially disadvantaged.

In the case of bulk commodity value chains, there is relatively little potential for increasing the value of the end-product (except for specialised niche production, or the long-term shifting of an entire sector to higher-value production[25]). The end-products are non-differentiated (for example, feed, maize, or cassava starch). In these types of value chains, increasing the value for poor and socially disadvantaged producers will require different strategies – for example, increased efficiencies in transportation and distribution, or higher agricultural productivity.

## Evolving concepts and contexts

Smallholder agriculture and food value chains operate within a rapidly changing global market and context. It is critical that value chain analysis can follow these changes and identify innovative development opportunities that enable poor smallholder farmers and micro- and small-medium agribusinesses to contribute, participate, and benefit.

### Global transformations in food and agriculture value chains

Meeting global food demand will continue to be a major challenge over the next two decades. By 2050, the FAO predicts the world will need twice the amount of food produced in 2013. This provides both major opportunities and challenges to farmers and agribusinesses operating in smallholder agriculture value chains[26].

25. See for example: https://www.ifc.org/wps/wcm/connect/b2cf6f8e-a790-46ce-a42a-49d72b726008/StoriesOfImpact2014_CambodiaRice.pdf?MOD=AJPERES&CVID=kCGj7Nt
26. FAO, *The future of food and agriculture: Trends and challenges*, Rome, Food and Agriculture Organization of the United Nations, 2017, http://www.fao.org/3/a-i6583e.pdf.

Ongoing population increases, economic development, competition for agricultural land and water resources, climate change, and environmental concerns are demanding greater competitiveness and efficiency to produce more with less. In many emerging economies, particularly in Asia, surging household incomes, urbanising populations, and changing demographics are rapidly increasing the demand for more diverse, high-value foods, including meat and fish, fruit, vegetables, oils, and prepared foods. Globally, consumers increasingly insist on, and are willing to pay more for, higher standards of food quality, safety, freshness, consistency, convenience, and traceability.

Higher-value niche agricultural markets, supported by certification systems and standards, are also developing around consumers' increasing demands for safe, healthy, and nutritious food. Increasingly, products are also required to have ethical, environmental, and organic credentials, or provenance and geographic origin characteristics.

In response, global agri-food value chains and markets are rapidly transforming and becoming more integrated[27]. While traditional food markets still dominate in Asia, a revolution is occurring in vertically and horizontally integrated modern retail, supermarkets and convenience stores, food processing and convenience packaging, and integrated logistics and cold chains[28].

## Sustainable food systems

Recent trends towards sustainable food systems approaches expand on value chain development methods to include interactions between multiple food value chains and the whole food system. They explicitly address issues of food security, health and nutrition, and the environment[29]. This should be a reminder for value chain researchers that farmers and firms most often produce a portfolio of products to provide diversified sources of income to support their livelihoods as part of a whole farm or enterprise system. It is therefore critical that value chain approaches are not blind to the choices, interactions, and trade-offs that exist between different crops, products, and markets.

The value chain analysis framework can thus be adapted to be more aware of the important choices that smallholder producers have to make within their broader livelihood context. There should also be more awareness of the nutritional, safety, health, and provenance values placed on food by consumers; not just the amount produced, its economic value, and how it is distributed.

27. T. Reardon and P. Timmer, The Economics of the Food System Revolution, *Annual Review of Resource Economics*, 2012, no. 4, pp. 225–264.
28. T. Reardon et al., *The Quiet Revolution in Staple Food Value Chains: Enter the Dragon, the Elephant, and the Tiger,* Mandaluyong City, Philippines, Asian Development Bank and International Food Policy Research Institute, 2012.



## Digital agriculture

Value chain approaches also need to understand how digital technologies fit within the suite of upgrading options, and the barriers and opportunities that exist for smallholders, the poor, or women.

The global revolution in digital technologies and applications has the potential to transform how smallholder agricultural value chains and markets function at all levels[30]. Case studies show promise that innovative digital applications may overcome some of the traditional barriers experienced by smallholders in value chains. Already, digital tools for agriculture and finance are transforming linkages and relationships, coordination and cooperation, communication, information and knowledge flows, marketing, financial services, and product procurement and transport. However, agriculture remains the least digitised of all major industry sectors, and adoption of digital technologies in smallholder value chains remains at the very early stages and fraught with numerous challenges and risks.

A broad range of digital technologies and applications are being proposed, developed, and trialed for agriculture. These include artificial intelligence and machine learning, automation, robotics, sensing and control systems, Internet of Things (IOT), big data and analytics, GPS positioning and mapping systems, digital labels (e.g. GS1) and distributed ledgers (e.g. blockchain)[31]. However, not all digital technologies and applications will be suitable or beneficial for smallholders.

Value chain research needs to address key questions about the benefits and opportunities of digital technologies for smallholders, agribusiness firms, and other chain actors, including:

- What role can digital technologies have in smallholder agriculture and value chains?
- How can digital technologies improve the functioning and efficiency of value chains?
- Where and how might digital technologies provide realistic solutions? How are these best identified and implemented?
- How accessible are digital technologies to smallholder men and women farmers and agribusinesses?

Value chain approaches are therefore increasingly required to evaluate and identify opportunities for digital technologies amongst a broad range of options.

29. FAO, *Sustainable food systems. Concept and framework*, Food and Agriculture Organization of the United Nations, 2018, http://www.fao.org/3/ca2079en/CA2079EN.pdf, (accessed May 2020).
30. FAO, *Tackling poverty and hunger through digital innovation*, Food and Agriculture Organization of the United Nations, August 2018, http://www.fao.org/3/ca1040en/CA1040EN.pdf.
31. P.K. Das and M. Hamp, *Digitalization for Agricultural Value Chains in China and India: Practical examples of software-based solutions for smallholder producers*, Bangkok, Asia-Pacific Rural and Agricultural Credit Association (APRACA), 2019.

Reducing soil erosion, improving incomes, promoting healthier diets, and increasing resilience to the impacts of climate change are major challenges facing farmers and sustainable food systems in the mountainous regions of northern Vietnam.
Photo: ©2016CIAT/GeorginaSmith

Tablets are used to collect field and livestock data in Vanuatu. Photo: ACIAR/ConorAshleigh

# 3. Methods and Data Collection

# Introduction

Value chain research should provide the evidence to identify development opportunities and chain interventions, and/or to evaluate policies or develop policy recommendations. Good value chain studies need to produce more than descriptive summaries. The research methods should support critical, substantive analysis and rigorous evidence gathering about the current situation, what changes could improve chain competitiveness, and options to produce better incomes and livelihoods for participants.

Selecting suitable research methods is a very important step in the value chain research cycle. This chapter provides practical guidelines about the research and data collection methods to use when applying the value chain tools outlined in following chapters.

Value chain studies often apply a mixed-methods approach. Mixed-methods can combine deeper human insights from qualitative methods (e.g. focus group discussions, semi-structured key informant interviews and direct observation) with statistical characterisation from quantitative methods (e.g. structured survey questionnaires from larger samples of farmer households or consumers). This provides a better understanding of research problems compared to either approach alone.

Focus Group discussions about inclusive business models in Dong Hoi, Quang Binh, Vietnam. Photo: ©2015CIAT/GeorginaSmith



The final choice of methods is often determined by the available time and resources, geographic scope, the complexity of the chain and the primary purpose and focus of the research. On some occasions, a rapid appraisal will be required, and qualitative data will be collected from a relatively small sample of informants. In other cases, larger, stratified samples of one or more groups of actors, such as farmers or consumers, might be collected using structured surveys, in combination with key informant interviews and focus group discussions.

## Terminology

### Research Methods

**Research cycle** is a series of steps in the research process designed to: identify the main questions or problem; design the study and choose methods; carry out research; analyse and interpret results; and report and disseminate results.

**Research methods** are the different procedures and tools used to collect and analyse data to find a solution to a problem. Semi-structured interviews and focus group discussions are research methods commonly used in value chain studies.

**Primary data** is data or information that never existed before and is collected for a specific purpose.

**Secondary data** is data that has been previously reported or published in journals, reports, online sites, or databases.
Data collection methods for primary data are commonly divided into two categories: qualitative and quantitative.

**Qualitative methods** are based on in-depth written or spoken narratives from a small sample of participants. They include interviews, focus group discussions, observations, and case studies and are commonly applied in value chain studies. Qualitative methods can answer the question “why” but are often not generalisable to the population at large.

**Quantitative methods** are based on numbers, mathematical calculations and statistical and econometric analyses. Data are collected from large samples, often using structured surveys. Quantitative methods should represent the population and provide statistical evidence to questions such as “how much” or “how many” (e.g. average production yields, incomes, or number of farmers adopting various practices). However, it rarely provides insights into “why”?

**Mixed-method** approaches use a combination of qualitative and quantitative methods for collecting, analysing, and interpreting data.

# Objectives

The main objectives of this section are to:

- Understand different research and data collection methods used in value chain studies, and how to correctly select and apply them
- Recognise how to apply a gender lens in the design and implementation of value chain research
- Learn about sampling and data collection, and how to validate and interpret data
- Provide tips about team size and composition.

# Applying a Gender Lens

To better understand gender roles, barriers, and opportunities in agricultural value chains, a gender perspective or lens should be integrated into all aspects of the research cycle, methods, and data collection[1] .

A gender lens provides a gender-nuanced or gender-disaggregated perspective of chain structures and conduct. This requires understanding of the differential position and roles of women and men in the value chain, as well as their specific resources, constraints, needs, and opportunities. This may lead to gender-sensitive recommendations and, in some cases, recommendations that specifically aim to address gender inequalities.

The gender research cycle model below in Figure 1 can help to consider gender in all stages of value chain research. The following sections in this chapter include ideas for how a gender lens can be included in research methods and data collection processes.

Research questions and hypotheses, research methods, data collection tools, and study samples need to reflect gender and social inclusion as key areas for enquiry. The guiding questions in Box 1 below can help researchers to understand gender equality issues in key domains of empowerment and provide guidelines on what information to collect.

1. J. Njuki, 'Practical Notes: Critical Elements for Integrating Gender in Agricultural Research and Development Projects and Programs', *Journal of Gender, Agriculture and Food Security*, vol 1, no. 3, 2016, pp. 104-108.



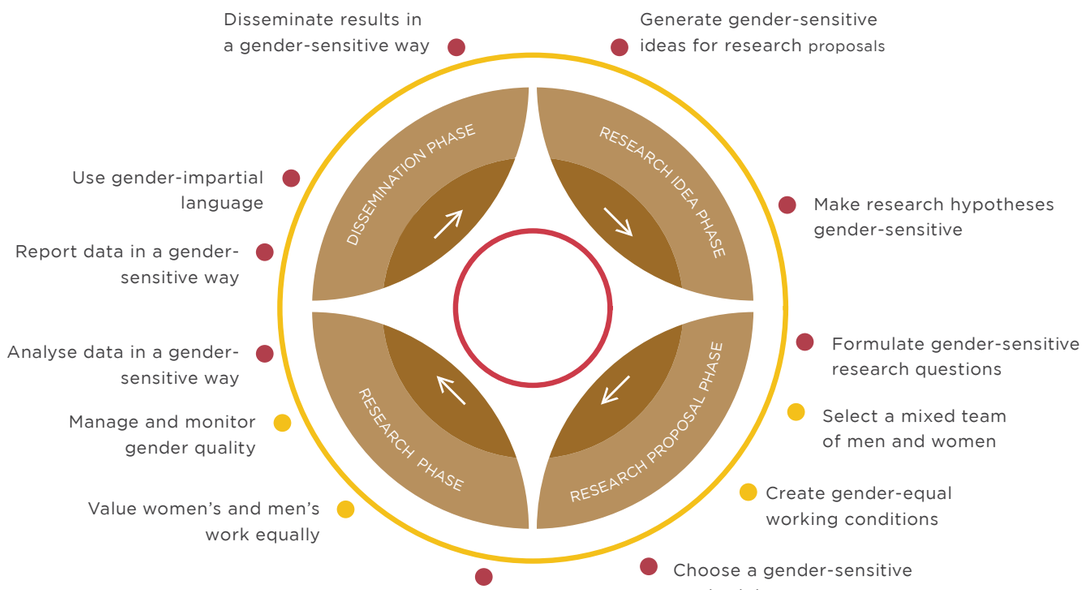



Figure 1. Model for taking gender into account at all stages of the research cycle
Source: European Commission, 2011[2]

Equal opportunities for men and women in research

Gender in a research content

2. European Commission, *Toolkit for Gender in EU Funded Research*, Directorate-General for Research and Innovation, 2011, https://www.ki.si/fileadmin/user_upload/KINA24840ENC_002.pdf.

**Box 1: Questions to consider for understanding gender equality and women's economic empowerment[3]**

| Domain of empowerment | Example questions |
|---|---|
| **Economic advancement – increased income and return on labour** | • What are the proportions of women and men working in this value chain (including in inputs, production, processing, transportation, and trade), and how do their roles differ? What value is ascribed to women's roles? |
| | • When working on farms (outside the household farm), how do women and men's work and **remuneration** differ? Are women paid less for the same work? |
| **Access to opportunities and life chances** | • What **mobility** do women have, and how does this impact on their participation in agriculture? How is it likely to impact on their participation in project activities? Does this vary with socioeconomic status? |
| | • What is the level of **literacy** and **numeracy** that women have? How is this likely to impact on their ability to participate in agricultural value chains? |
| **Access to assets, services, and needed supports to advance economically** | • What **productive assets** do women and men own? Who is the decision maker regarding purchasing, selling or transferring of assets? What are the capabilities of women to use these resources? |
| | • How much **land** is owned by women and men? How does farm size and location vary by gender? What legal rights do women have to hold land and secure tenure? |
| | • What **technology** do women and men have access to? Does the technology meet women's needs? For example, Labour-saving technology or technology for women-specific crops |
| | • To what extent do women and men have contact with **extension** agents? What is the ratio of women-to male-extension agents? |

3. Australian Department of Foreign Affairs and Trade (DFAT) *Operational Guidance Note on Gender equality and women's economic empowerment in agriculture,* 2015. https://www.dfat.gov.au/sites/default/files/operational-guidance-note-gender-equality-and-womens-economic-empowerment-in-agriculture.pdf



**Box 1: Questions to consider for understanding gender equality and women's economic empowerment (continued)**

| Domain of empowerment | Example questions |
|---|---|
| **Access to assets, services, and needed supports to advance economically** | • To what extent do women and men have access to **financial services**? What chance do women have to use land title as collateral? |
| | • Do **policy and institutional settings** support women to have greater ownership of assets and access to services? |
| **Decision-making authority in different spheres, including household finances** | • To what extent are women able to make **decisions** on a range of issues, including income and assets? |
| | • Do women take on **leadership** positions? What influence do they have? |
| | • How strong are women's capacities in **trade and negotiation**? How well are women connected to markets and are they able to access market information? |
| **Manageable workload** | • What is the **gender division of labour** for household work and agriculture work? |
| | • What opportunities are there to reduce **women's workload** or to redistribute responsibilities within households? What opportunities are there to encourage men to create a supportive environment and share unpaid workload? |
| | • What impact is women's increased agriculture work likely to have on **infant and young child feeding and care?** |

Source[3]

# Data Collection Methods

Common data collection methods used in value chain research are described in this section. Semi-structured key informant interviews, focus group discussions and direct observation can be described as qualitative methods for primary data collection, whilst structured surveys are considered a quantitative method.

## Review of secondary data and information

The review, analysis and synthesis of data and information from statistics, publications and reports provides invaluable context and supporting evidence about different target groups, sectors or products when prioritising and selecting value chains (prioritisation of value chains is discussed in detail in Tool 1 in Section 2 of this toolbook). It will also shape subsequent research questions and data collection activities.

Useful information about the main production areas, key distribution centres, final-destination markets, and important market players and segments can be gathered during this process. Anthropological or socio-economic studies can also provide useful information and insights about the livelihood and socio-cultural context and challenges of the local target populations.

Examples of secondary data and information sources are provided in Box 2 and Box 3.

Insights gained from reviewing existing reports and publications should provide an initial perspective about certain issues and some working hypotheses that can be followed up in subsequent discussions with key informants. Areas where important data and information is missing or contradictory, or where different analysts disagree, will merit special attention during key informant interviews. Data and information published in online articles and news often requires validation from other secondary or primary sources.

Secondary data will need to be revisited during the analysis of primary data and the writing of the final report. This will enable analysts to develop a more comprehensive and robust picture of the value chain and the overall external environment.



**Box 2: Examples of sources of secondary data**

**Agricultural Production and Trade Statistics** published by national statistical offices and international organisations such as the Food and Agriculture Organization of the United Nations (FAO) or International Trade Centre (ITC).

**Government household surveys** sometimes provide a range of useful data, from farm size to input use, farm productivity, and even food consumption.

**Academic papers and studies' reports** may contain valuable data and analysis on various issues, including production, marketing, processing, international trade, and consumption.

**Reports** from government agencies, international agencies, NGOs, and projects may also cover a broad range of relevant issues.

**Online news and articles** often include relevant information about laws and regulations, companies, investments, transportation infrastructure, promising technologies, and developments in the production and marketing sphere etc.

**Box 3: Accessing and using secondary price data in a study of the mango value chain in eastern Indonesia**

Price analysis can generate key insights about markets and value chains. Whilst spot price data can be collected, time series data required for trend and seasonality analysis is only accessed from secondary sources.

For example, in 2012 a team researching the mango chain succeeded in obtaining daily price data over a three-year period for a small fee from the management board of Kramatjati Wholesale Market in Jakarta, Indonesia. An analysis of price seasonality, combined with an assessment of technical options and their profitability, enabled the team to identify flowering manipulation as an innovation with significant potential to increase farmer incomes. The analysis led AIPD-Rural, an Australian-funded project, to partner with Syngenta for promotion of crop manipulation technologies with potential to produce an early (May to July) harvestas shown in the figure below.

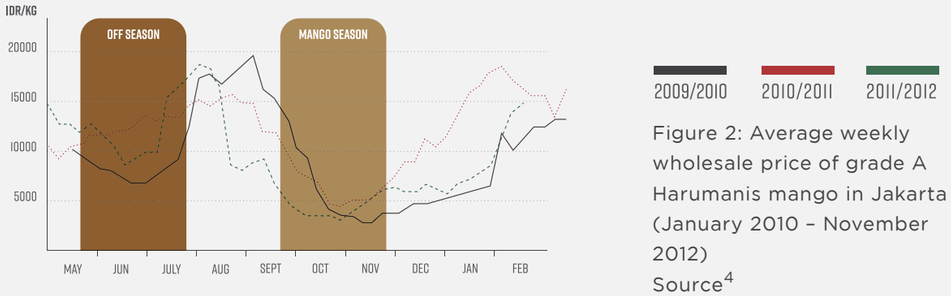



Figure 2: Average weekly wholesale price of grade A Harumanis mango in Jakarta (January 2010 – November 2012)
Source[4]

4. Data supplied by Kramatjati Market Management Board

*Harumanis* mangos are commonly sold at roadside stalls in Surabaya, Indonesia. Photo: Oikoi

## Semi-structured key informant interviews

Semi-structured, key informant interviews are usually the main method for primary data collection. Two broad categories of key informants are normally targeted:

- **Knowledgeable observers.** These people do not participate in the production and marketing of the commodity in question but may offer important information and insights. Academics, researchers, retired food industry managers, policy makers, other government officials, extension officers, and staff from donor agencies, NGOs, or projects all fall under this category.
- **Direct or indirect market participants.** These are either involved in the production, marketing, and processing of the agricultural commodity under analysis (e.g. farmers, traders, and processing firms) or engaged in the delivery of commercial services to value chain participants (e.g. input suppliers and transporters).

Semi-structured interviews are not based on a rigid sequence of short and precise quantitative questions, as is the case with structured interviews. Instead, they consist of a series of exchanges and discussions around pre-determined questions and topics following a flexible interviewing format.

This type of interviewing is particularly suited to in-depth probing around a wide variety of issues, including practices, choices, beliefs, expectations, norms, patterns, trends, linkages, relationships, flows, opportunities, constraints, and underlying causes of behaviours. It provides an avenue for asking a set of complementary questions on different issues, including what, when, where, who, how many, how much, how, and why.

Checklists are typically used to guide these interviews. Lists of topics, issues, or questions serve as prompts or reminders. This helps researchers follow a certain sequential logic in their questioning. There is plenty of scope, however, for deviation from a certain order of enquiry.

Checklists should generally be specific to each group of actors. For example, input dealers can provide useful information about the technologies available to and used by farmers in their area, but will generally know very little about agricultural marketing systems. An example of a key informant survey checklist for wholesalers in the mango value chain in eastern Indonesia is shown below in Box 4.



**Box 4: Example of semi-structured interview checklist for wholesalers used in a mango value chain study in eastern Indonesia**

| Wholesalers/Inter-island Traders | |
|---|---|
| **1. Background information** | • Location/address/contact<br>• Range of fruit traded<br>• Number of years trading mango |
| **2. Fresh mango sales** | • Ton of fresh mango sold per annum<br>• Distribution of sales within the year<br>• Different market channels and their relative importance<br>• Growth trends in different market channels/segments<br>• Challenges and strategies to increase mango sales |
| **3. Varieties** | • Varieties sold<br>• Ranking of different varieties according to sales, and reasons<br>• Differences in varieties traded per market channel or type of client<br>• Key changes in the varietal portfolio (last 3 years) and reasons<br>• Assessment of different varieties in term of agronomic performance, seasonality, appearance, eating quality, consumer demand, export potential, and market prices |
| **4. Supplying areas** | • Relative importance of different provinces/districts, and reasons<br>• Differences between supplying areas in term of variety and quality<br>• Changes in the relative importance of different supplying areas, and reasons |
| **5. Linkages with suppliers** | • Type and profile of suppliers, and relative importance<br>• Services provided by the trader to suppliers (e.g. advances)<br>• Information flows from the trader to suppliers, and vice-versa<br>• Purchasing conditions set by the trader (variety, quality, pricing, payment procedures, other)<br>• Does the trader have contractual relationship with suppliers? if yes, what are the terms of the contract? If not, how does s/he coordinate with suppliers? How is the negotiation process conducted?<br>• Strengths and weaknesses in the relationship with suppliers<br>• Trader's strategy to address weaknesses in the relationship with suppliers |

**Box 4: Example of semi-structured interview checklist for wholesalers used in a mango value chain study in Eastern Indonesia (continued)**

| Wholesalers/ Inter-island Traders | |
|---|---|
| **6. Linkages with buyers** | • Main buyers: location, legal status, and scale<br>• Chain in buyers portfolio during the last 3 years, and reason<br>• Service received from buyers (e.g advisory, market information,...)<br>• Information flow from the traders to buyers, and vice-versa<br>• Conditions set by buyers (quality, volume, delivery times, pricing, payment procedures, other)<br>• Does the trader have a contractual relationship with buyers? If yes, what are the term of the contracts ? If not, how does s/he coordinate with buyers? How are the transactions negotiated?<br>• Strengths and weaknesses in the relationship with buyers and strategies to address weaknesses |
| **7. Quality management systems** | • Quality grades and standards of the trader and buyers<br>• Quality management systems by the trader, upstream suppliers, and downstream buyers<br>• Coordination systems for ensuring that quality grades and standards are met<br>• Sanctions to suppiers and the trader for non-compliance?<br>• Strengths and weaknesses in quality management systems<br>• Typical quantitative and qualitative product losses experienced |
| **8. Sources of market information** | • Trader's assessment of his/her access to information about mango markets<br>• Main sources of information about mango markets<br>• Assessment of different sources of market information (regularity, type of information, and reliability of the information)<br>• Gaps in market know-how |
| **9.Gender** | • Typical gender of wholesalers/ Inter-island traders<br>• Gender of suppliers<br>• Gender of buyers |
| **10. Prices** | • Mango price trends for different varieties (past 3 or 5 years), and reasons<br>• Are they any clear differences in the prices paid by different buyers?<br>• Price seasonality within Indonesia<br>• Current mango purchasing and selling prices (different varieties, different grades) |



**Box 4: Example of semi-structured interview checklist for wholesalers used in a mango value chain study in Eastern Indonesia (continued)**

| Wholesalers/Inter-island Traders | |
|---|---|
| **11. Costs** | • Main costs to the wholesaler (variable and fixed)<br>• Costs per ton sold |
| **12. Business environment** | • Assessment of the policy and regulatory environment in Indonesia<br>• Trader's assessment of support infrastructure<br>• Trader's assessment of other important business environment dimensions |
| **13. Constraints, opportunities and interventions (wrap-up)** | • Key opportunities for the development of the mango trading business<br>• Barriers to develop or access these opportunities<br>• Strategies to develop or access these opportunities<br>• Key challenges and constraints (w/prioritisation)<br>• What should be done to address challenges and constraints?<br>• What are the key changes or developments that can enable the development of mango trading? What needs to change? What are the key innovations required?<br>• Recommendations for public and project interventions aimed at enabling these developments<br>• Does the trader see any opportunities for collaboration with a development project intervening in the mango sub-sector? |

Source: Wandschneider et al, 2013[5]

## Semi-structured key informant interviews

(Continued)

It is very important that checklists and interviews with market participants are treated as opportunities to gather valuable information about other chain participants and enterprises, and the value chain more generally. This enables the research team to develop a comprehensive and nuanced understanding of the value chain in a context where sample numbers are small, and therefore may be unrepresentative.

Checklists can be revisited during fieldwork and modified as appropriate, deleting questions that are not appropriate and adding questions on issues that merit further examination.

While there are no rigid rules regarding the sequencing of interviews, targeting informants with a broader, more systemic

5. T. Wandschneider, I. Baker, and R. Natawidjaja, Final Report: *'Eastern Indonesia Agribusiness Development Opportunities - Mango Value Chain'* (AGB-2012-006), Australian Centre for International Agricultural Research, 2013, https://ei-ado.aciar.gov.au/sites/default/files/Wandschneider(2013)EasternIndonesiaAgribusinessDevelopmentOpportunitiesAnalysisMangoValueChains_ACIAR.pdf

perspective first is often a good strategy. These informants may include particularly knowledgeable and insightful academics, procurement managers of large supermarket chains, wholesalers in major distribution and consumption centres, and large processors and exporters.

In research contexts where there is no specific geographical focus, a common option is to visit key terminal markets before other upstream market segments. Where there is a special interest in certain geographic areas, researchers may want to start their investigation in selected locations within those areas, then follow the chain downstream. In such cases, care is needed to ensure that the sample includes competing production areas, in order to gain a system-wide perspective.

Establishing good rapport, clear communication, and trust with key informants is essential for successful semi-structured interviews. Informed consent, either verbally or on a written form, should be obtained.

A friendly and relaxed attitude is recommended. At the same time, the informant should be made to feel s/he is the expert. Questions should be simple and direct. Paraphrasing statements from the key informant is a good way to ensure that certain messages have been clearly understood. Sensitive questions should be left for last, and informants should only be asked for their telephone and e-mail contact for possible follow-up at the end of the interview.

The interviewer's gender, perceived seniority, or technical competency may influence the interviewee's attitude and the quality of information shared. These factors should be considered when putting interview teams together.

Collecting field data with rice farmers in Central Laos.
Photo: ACIAR/Massimo Munnichi



## Focus group discussions

A focus group discussion can be defined as an in-depth group interview with a relatively homogeneous group of people gathered to provide information around topics specified by a facilitator.

Focus group discussion methods are often employed to gather information from farmers or from consumers to identify key issues. They are also helpful for developing questions for in-depth interviews and structured survey questionnaires, or for pre-testing market research. However, in a value chain research context, focus group discussions can be used much more widely. For example, a focus group discussion with extension staff from a given area, or from different locations, may be a better option than individual semi-structured interviews with these chain informants. Likewise, while agro-input dealers can be interviewed separately, they can also be convened to talk about input chains and technology adoption in a group setting.

Selecting informants according to gender and other socio-economic characteristics may prove appropriate in contexts where hierarchical and power relations are likely to undermine participation. For example, if women are uncomfortable talking about certain questions in the presence of men, reluctant to contradict them in public, or inclined to let them take the lead in public discussions, it might be best to organise gender-segregated meetings. Also, women and men have different roles, opportunities, and social networks across value chains. In the mixed focus group discussions, those gender differences tend to be overlooked.

More generally, it may make sense to have separate focus group discussions with economically and socially disadvantaged groups, including the poor and ethnic or religious minorities, to identify their specific challenges and constraints in the value chain. Power dynamics may equally undermine data collection when managers and members of a cooperative, local government officers and farmers, or project staff and project beneficiaries, are participating in the same focus group discussion. In some contexts, age is another dimension that may need to be considered, especially in the context where seniority is associated with power, and/or the project has a specific target for engaging with specific age groups, such as young female or young male actors.

Whilst it is generally ideal to have separate focus groups for men and women, in some cases this may not be possible. In this case it is desirable to take a flexible approach that includes both men and women in the overall discussion, but split into separate gender groups for some topics, in the recognition that men and women have different knowledge and understanding around different topics. Box 5 gives an example of information-gathering activities within a focus group discussion around cassava farming in Cambodia. Some of these activities were undertaken jointly with both men and women farmers and others were undertaken separately.

**Box 5: Focus group discussion information-gathering activities**

Focus group discussions were conducted with groups of cassava farmers in a number of study communities in Cambodia. The focus group discussions were run by a team of facilitators and reporters, and comprised nine key information gathering activities:

- **Activity 1** *Basic village information* - gathering basic socio-economic and agronomic information about the village and basic information on any farmer groups operating in the village. **All participants together**
- **Activity 2** *Livelihood activities* - gathering information on agricultural activities, off-farm income, and non-farm activities and remittances. **Split into male and female groups**
- **Activity 3** *History of cassava production in the village* - gathering information on key village events. **All participants together**
- **Activity 4** *Seasonal calendar* - gathering month-by-month information on key cropping and livestock activities. **All participants together**
- **Activity 5** *Cassava production budget* - gathering information on costs of land preparation, varieties, seed system, fertility management, weed management and post-harvest as well as information on intercropping, cassava yields, and prices of roots and chips. **All participants together**
- **Activity 6** *Cassava utilisation and value chain* - gathering information on the use of cassava, who makes decisions about selling, who and where the product is sold to, what is the contractual relationship with the buyer. **All participants together**
- **Activity 7** *Ranking of importance of activities* - gathering information on the relative importance of various activities in terms of household food security, household cash income, and use of labour. **Split into male and female groups**
- **Activity 8** *Problems and constraints* - gathering information on the major constraints or problems with cassava production, including access to planting material, labour availability, soil fertility, soil erosion, pests and disease, and access to credit. **Split into male and female groups**
- **Activity 9** *Potential interventions and ranking* - gathering information on farmers' opinions on potential interventions to enhance the sustainability of cassava production. **Split into male and female groups**

Source[6]

6. Focus Group Discussion checklist for Cambodian cassava value chain activities for project, *Developing cassava production and marketing systems to enhance smallholder livelihoods in Cambodia and Lao PDR*, Cassava Program Discussion Papers, ASEM/2014/053, https://www.researchgate.net/publication/329583684_Value_Chain_Analysis_Household_Survey_and_Agronomic_Trial_Results_Lao_PDR



## Focus group discussions

(Continued)

As in the case of individual semi-structured interviews, a researcher or practitioner guides an informal discussion with the aid of a carefully prepared checklist. As there are a larger number of several participants in a focus group discussion compared to a key informant interview, "interviewers" need to additionally take on a strong facilitation and moderation role.

Researchers and practitioners may encounter and need to manage the following challenges when conducting focus group discussions:

- **Group dominance.** There is often a tendency for certain individuals to dominate a discussion because of their personality, power, status, or other reasons.
- **Groupthink.** Participants may refrain from expressing alternative views for fear of sanctions or disrupting relations within the community. Therefore, the consensual views voiced may not accurately reflect the knowledge, experiences, and perspectives within the group.
- **Social desirability bias**. People often avoid revealing behaviours, practices or views that are socially unacceptable or frowned upon. For example, if a group of men and women farmers are asked about gender divisions of labour without careful facilitation, participants may be inclined to answer that both men and women share tasks equally, and that men are very supportive to women, which may or may not be the case.

A good moderator will be mindful of these risks, pay attention to group dynamics, and find ways to open up the discussion and encourage honest exchanges. S/he will also be able to draw on better-informed, more knowledgeable individuals who may have more to offer in a discussion about value chain structures, practices, patterns, and relationships.

It is important to make the purpose of the research clear to all participants from the onset. However, expectations should be managed regarding possible benefits that may accrue to participants, as this may condition their replies. An informal, relaxed environment will make participants feel comfortable and contribute to an open and lively exchange. Acknowledging and valuing different contributions, even if outside the initial discussion script, inviting quieter individuals to intervene, or asking the group to comment on the information and views from a dominant member, will also encourage participation and reduce response bias.

The geographical scope of the research and the heterogeneity of farming and marketing systems should be considered when defining the number of focus group discussions. Participants should then be

## Focus group discussions

(Continued)

selected based on their ability and capacity to provide relevant information. Around eight participants are usually adequate, allowing for the provision of a variety of views and information. Larger groups can make it difficult for all participants to adequately contribute to the discussion. The duration of a focus group will vary, depending on the issues under investigation and their complexity, but should not exceed two or two-and-a-half hours. After a while, the quality of the data and information will start declining due to facilitator and participant fatigue. It is important to arrange a time and venue for interviews that are convenient to both women and men participants, as they often have different time commitments throughout the day.

## Direct observation

Direct observation is a method for collecting and evaluating data based on what is observed. It provides opportunities for documenting activities, behaviours, and physical assets through visual observation, without having to depend on people's willingness or ability to respond to questions.

Direct observation techniques are often used when a team is in the field interviewing market participants, as much can be learned from simple observation. During visits to input outlets, for example, researchers can visually inspect the range and quality of agricultural inputs available.

Focus Group Discussion with farmers in Dong Hoi, Vietnam, Quang Binh.
Photo: ©2015CIAT/Georgina Smith



Village transect walks can be used to better understand the farming system from the production side. For example, farms visits provide opportunities to witness crop and varietal choices, farm management and post-harvest practices, and gender division of tasks.

An appointment at a processor's premises allows researchers to observe the level of activity, technology choices, or the capacity and use of storage facilities, for instance. Markets also provide a wide range of visual information, from trader numbers and types to produce quality, traded volumes, and the type of transportation vehicles used. Similarly, "walking-the-chain" appraisals can provide an overview of the general function and form of a specific value chain.

In value chain studies, direct observation should always be viewed as a complement to other primary data collection methods, never as a substitute. The understanding gained from opportunistic observation can be used to inform and enrich individual and group interviews. It can also be triangulated with what informants are saying; for example, with regards to the varieties they grow, the scale of their operation, or the quality of the produce handled, thereby serving as a very useful data validation method.

Conducting direct observations and informal interviews with vegetable retailers in a street-market in Mandalay, Myanmar.
Photo: Helvetas/Ngoc Anh

## Structured surveys

Structured surveys are the main quantitative method used in value chain research. They are used to collect data and information from a larger sample of chain actors or groups.

A structured questionnaire or survey generally asks respondents a pre-determined, sequentially-ordered set of questions. Direct, closed questions are most common; however, open questions can also be used.

The purpose, resources, and circumstances of the study may determine the decision to use a structured survey. For example, some analysts may need to learn more about quantifying-specific characteristics or differences that exist within or between sub-groups of actors, processes, market channels, or geographic areas. This is often the case when there are very large numbers and considerable variability amongst a certain group of actors such as farmers, traders or consumers.

Several questions should be considered when planning and implementing a structured survey. These include:

- Why is a structured survey necessary?
- What key quantitative data and information needs to be collected?
- Is there a need to stratify the sample for different sub-groups?
- How large should the sample be?
- How will the sample respondents be identified and selected?
- How and where will women and men be represented?
- Who will conduct the survey? How will they be trained?
- What activities are needed to inform and pre-test the survey?
- How will the data be collected, i.e. using hard-copy pen and paper or mobile digital platforms?
- How will the data be managed and analysed? and
- What time and resources are available to undertake the survey?

Record keeping for safe vegetable production in Moc District, in northern Vietnam.
Photo: ACIAR/Vietnam

## Structured surveys

(Continued)

Structured surveys can capture specific information about household or enterprise asset endowments, income, expenditure and labour allocation, demographics, gender roles, and agronomic practices, activities and production. Information about women and men's access to finance and information, knowledge and skills, and attitudes, experiences, perceptions, and aspirations can also be captured.

The number of respondents surveyed, or sample size, is very important for ensuring that the data and results are statistically valid. Conducting surveys with a small number of respondents (a small sample size) is usually inappropriate and can result in false conclusions. For example, calculating percentages or averages from a survey of five to ten participants may be very misleading. See example sampling strategies in Box 6

It is important to ensure the sample of targeted actors for data collection is sufficiently large enough to be statistically relevant. As a rule of thumb, a sample of around thirty participants, or data points, is generally considered sufficient to provide a statistically valid analysis. However, this will depend on factors such as the size and heterogeneity of the population. To reduce sampling bias, interview subjects

### Box 6: Example sampling strategies for value chain surveys

In a set of cassava value chain studies undertaken by the University of Queensland, researchers, and partners in Vietnam, Laos, Cambodia, and Indonesia, the sampling strategy was designed to allow statistical analysis by using a variety of stratifications.

In each project district, two communes/towns were chosen as research sites. Within each locale, two villages were selected for survey activities. The villages were selected based on a detailed set of criteria, but the main criterion was their location within the commune/town. In each commune/town, one chosen village was situated close to the commune/town centre, whereas the other was more remote.

In each village, a total of thirty-two households were selected at random from a list of households in the village. This enabled simple descriptive statistical analysis of the socio-economic, agronomic, production, and farmer perception data at the village level.

In another example, the first-ever analysis of the aquaculture value chain in Myanmar was conducted by Belton et al. (2017)[7]. A review of secondary sources and remote sensing and geographic mapping to locate aquaculture pond clusters initially informed the study. This was followed by a rapid reconnaissance study of key informants. Following that, a total of 251 interviews were conducted with upstream, mid-stream, and downstream value chain actors in four locations. Larger samples were collected for key actors, enabling the following statistical analysis: over 50 upstream nursery, hatcheries, and feed traders; 87 mid-stream fish farmers; and 35 down-stream fish traders.

Source: Belton et al. (2017)[7]

7. B. Belton, M. Filpski, and C. Hu, *Aquaculture in Myanmar: Fish farm technology, production economics and management*. Research Paper 52. Food Security Policy Project (FSPP), 2017, http://ebrary.ifpri.org/utils/getfile/collection/p15738coll2/id/132424/filename/132632.pdf



should also be randomly or semi-randomly selected.

Sampling might also be stratified by pre-determined characteristics of the actor group, such as household income, ethnicity, proximity to markets, production scale, or market channel. It is also important that men and women actors are evenly represented in the sampling design, and that data can be disaggregated by gender. This ensures that potentially important sub-groups are sufficiently represented in the data and can be subject to basic descriptive analyses.

The design and content of structured surveys should be informed by information from secondary reviews, value chain mapping, key informant interviews, and focus group discussions with different actor groups.

Structured survey data are normally analysed using simple quantitative descriptive statistics. Results often provide quantitative evidence about the what, where, how many, and how much, but offer less insight about the why or how. Therefore, results from structured surveys should be complemented with deeper insights from qualitative methods. such as key informant interviews or focus group discussions.

### Box 7: Digital data collection

A range of digital software applications can be used in structured surveys to collect data directly onto tablets or smart phones. If properly implemented, mobile digital data capture can significantly improve the cost efficiency, speed, and accuracy of survey data processing and description. Commonly available data collection apps include KoBo Toolbox Survey CTO, CommCare, Open Data Kit (ODK), and Taroworks.

The Mobile Acquired Data resource website[8] provides useful information for digital data collection app users, including research case studies and evaluations of various apps' effectiveness, benefits, and considerations.

Source: ACIAR[8]

8. Australian Centre for International Agricultural Research, Mobile Acquired Data, https://co-lab.aciar.gov.au/mad/

# Data Validation and Interpretation

Triangulation is the cross-verification of data and information from multiple sources to identify consistencies and regularities, as well as discrepancies and variations. Triangulation can ensure that value chain data is valid and interpreted correctly, resulting in findings that are both accurate and credible.

Triangulation performs two essential functions:

- Data validation. Systematic cross-checking of sources and responses is necessary to assess data validity. It enables researchers to discern between accurate and inaccurate data, and between reliable and unreliable information.
- Data interpretation. Triangulation helps researchers to make full sense of the data and information gathered. Triangulation reveals different views and perspectives, as well as important regularities and disparities in structures, behaviours, preferences, patterns and processes, thereby widening and deepening our understanding of reality.

Two types of triangulation are considered in the context of a value chain study[9]:

- **Methodological triangulation** employs a combination of methods to address the same issue or question. This allows researchers to discard certain data, validate or refute particular interpretations, gather complementary evidence, explore different aspects of the same issue, and identify areas where further research is needed because the data is contradictory or inconsistent.
- **Data triangulation** compares different answers to the same question, and views and perspectives on the same issue. Such analysis will expose data inconsistencies, as well as similarities and differences between individuals, households, enterprises, and locations.

An example of methodological triangulation would be to ask processors about their business in the context of a semi-structured interview, and then compare their answers with the insights gained from direct observation. Another example would be to use farmer questionnaire data and farmer group discussion data to understand technology and market channel choices. (See example in Box 8 below).

As an example of data triangulation, researchers looking at the gender division of labour along a value chain could discuss the issue separately with female and male chain participants in focus group discussion settings, during key informant interviews,

9. N.K. Denzin, *The research act: A theoretical introduction to sociological methods.* New Jersey, Transaction Publishers, 1973.



or both. Triangulation of the data by location and region, or by ethnicity and income, could expose important spatial and socio-economic patterns.

The process of asking the same set of questions to market participants at adjacent segments of the value chain is a very powerful triangulation technique. It is known **as mirror image interviewing.** In a certain area, farmers may claim that local collectors do not pay differentiated prices according to quality, but what do those traders say? Are the answers of suppliers and buyers consistent? And if not, how can researchers find out what the true situation is? Further interviews with farmers and collectors should clarify the issue.

Clearly, the need for systematic triangulation must inform the whole research process, from the development of study samples and the design of research methods and tools, to the collection, analysis, and reporting of data. For example:

- A variety of locations and markets should be selected for a comparative perspective.
- The range of study informants should reflect the diversity of chain participants.
- Checklists must allow for mirror image interviewing techniques to be employed.
- During fieldwork, researchers will need to make sure that the same certain key questions are methodically asked to different informants until they start getting a consistent set of replies.

A comparative analysis of the data will continue after the fieldwork, including during the reporting of findings and conclusions.

**Box 8: Data and methodological triangulation in a study of the cross-border mango import trade between China and Vietnam**

In a recent study, triangulation of trade data and information from different sources proved essential for a proper understanding of the scale and evolution of the cross-border mango import trade between China and Vietnam[10].

The research team started by looking at official Chinese customs data, which can be accessed from the International Trade Centre (ITC) website[11].

10. H. Meiying et al., *The cross-border mango trade between China and Vietnam: Findings from a rapid market appraisal Component report*, Challenges and opportunities for meeting the requirements of Chinese mango markets (AGB/2016/00), October 2019, http://apmangonet.org/wp-content/uploads/2019/10/8.5-MM-Cross-Border-Study_China.pdf
11. 'International trade statistics 2001-2020', International Trade Centre (ITC), http://www.intracen.org/itc/market-info-tools/trade-statistics/

**Data and methodological triangulation in a study of the cross-border mango import trade between China and Vietnam**

According to Chinese customs data, imports of fresh and dry mangoes from Vietnam are negligible or non-existent. This is at odds with recent anecdotal information about significant mango inflows through the Guangxi border. The reason lies in the nature of the trade: the fruit is imported through grey trade channels. Cross-border grey trade is documented and declared in some way, and therefore legal, but not consistently included in Chinese official statistics.

A very different picture emerged when the research team consulted Vietnamese customs data. Official mango exports to China increased exponentially since 2012, reaching nearly 81,000 tons in 2016. On account of this trade, that year Vietnam overtook Pakistan as the world's sixth largest exporter.

| Source | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|---|---|---|---|---|---|---|---|
| **China Customs** | 0 | 0 | 12 | 0 | 0 | 0 | 226 |
| **Vietnam Customs** | 12 | n.a. | 37,898 | 63,709 | 37,088 | 80,670 | n.a. |

During semi-structured interviews with importers and wholesalers in China, the research team was able to confirm that, prior to 2013, mango imports from Vietnam were negligible. Key informants further noted that mango inflows from Vietnam continued to expand at a significant rate in 2017 and 2018. Based on information about the daily number of "mango trucks" crossing the Guangxi border, imports from Vietnam were projected to exceed 135,000 tons in 2018.

Source[10]

## Sampling and Data Collection

During the design phase, research teams will need to define the study or research locations, identify the different key informant categories, and determine the approximate number of informants per category and location. This process is called sampling.

This section provides some guidelines for planning and implementing sampling and data collection for semi-structured key informant surveys. Some of these principles also apply for structured surveys.

Sampling choices need to reflect the purpose and focus of the study, the range of information required, and the time and resources available (See examples in Box 6).



When developing a sampling framework, researchers need to answer the following three questions:

- *Sample units:* Who should be interviewed? Value chain participants are usually the main target for data collection, but key commercial service providers and knowledgeable observers should also be considered for an interview. Care is needed to ensure that larger market players are included in the sample, as they tend to be both influential in the chain and have a good overall understanding of the chain and the external environment.
- *Sample size:* How many people in each key informant category should be interviewed? The greater the diversity in the profile of chain participants, for example in terms of gender or ethnicity, socio-economic conditions, enterprise size and scale, organisation legal status or business strategy, the greater will be the need to increase sample size and perhaps stratify or balance sampling amongst subgroups. Larger minimum samples will be required when implementing structured surveys to obtain enough data points for meaningful descriptive and probability-based statistics.
- *Sampling procedure:* For qualitative approach chain sampling, a variety of non-probability, non-random procedures are typically used to arrive at a sample that is broad enough to provide a good understanding of a value chain. Convenience, snowball, and intercept sampling are commonly used. Random or semi-random sampling (for example, where a sample is selected from a list of local traders, input suppliers or even village farmers) should be applied for large structured surveys where basic statistical analysis is required.

**Convenience sampling** consists of selecting key informants based on practical considerations, such as ease of access, willingness to be interviewed, or availability. This approach is very convenient, particularly during the initial fieldwork stages, but on its own will generate an incomplete and skewed sample. It should therefore be used in combination with other sampling techniques.

**Snowball (or chain-referral) sampling** entails asking study respondents to identify or locate other relevant key informants, such as suppliers, buyers, or a specific type of market participant. Snowball sampling is widely used because it enables access to key informants that may otherwise be difficult to identify.

**Intercept techniques** are often used for selecting small and informal enterprises, such as small equipment workshops, input retailers, traditional traders, small-scale food processors, and transporters. Approaching these informants at their workplace is a practical way of sampling participants in informal market systems. In cases where

# Sampling and Data Collection
(Continued)

willing informants are very busy, the interview can be scheduled for another time, at the same or a more suitable location.

A flexible approach to sample structure and size is highly desirable in qualitative, semi-structured surveys. The initial choice of locations, markets and informants should be treated as indicative, not definite. It should be possible to introduce changes or adjustments during the fieldwork, according to need and opportunity.

Try this

**Box 9: Tips for considering local language and terminology**

How to deal with local language is a relevant issue related to structured surveys, semi-structured Interviews, and focus group discussions. The following tips below are worth keeping in mind:

- Interviews and surveys with value chain informants should ideally be conducted in their local language. This may require training of local language researchers and/or the use of translators.
- Define local language terms for common value chain terminology.
- Analysts should be aware of, understand, and use the colloquial terminology and jargon employed by local people when describing value chain processes, participants, and activities to gain deeper insights and avoid confusion during interviews.
- Good translators should understand the meaning and importance of these terms and jargon in local language and provide the best translation.
- Analysts should avoid using or translating value chain terminology and jargon (e.g. “actors”, “upstream” and “assembly traders”) that are unfamiliar to local informants and difficult to translate.
- There may be multiple words and meanings for the same thing in different locations. For example, in Northern Vietnam, custard apples are called *quả na* and soursops are known as *mãng cầu*, while in the South of Vietnam, custard apples are *mãng cầu ta* and soursop *mãng cầu Xiêm*.
- Land and farm areas may have different connotations in different locations. In Vietnam, a common unit of land measurement is the *sào*. In northern areas of Vietnam, the *sào* is 360m$^2$, in the central areas the *sào* is 500m$^2$, and in the south Vietnam, the *sào* is 1000m$^2$. In southern Vietnam, the term *công* is also used to refer to 1000m$^2$.



# Team Size and Composition

Multi-disciplinary value chain research teams with a range of complementary skills and expertise can be very advantageous. Useful knowledge and skills within a team include:

- a strong grasp of economics and strategic marketing;
- previous experience in value chain research and agricultural commodity analysis;
- technical expertise in sector agronomy, post-harvest and processing;
- expertise that can integrate a gender and women’s economic empowerment lens within value chain research;
- sociologists and anthropologists who can provide insights into human geography and socio-cultural influences and use of qualitative methods for disaggregated, socio-economic analysis focused on poverty, livelihood, and/or gender;
- strong interviewing experience and skills; and
- knowledge about local value chains, market channels and actors.

Mainstreaming gender and social inclusion into value chain research requires specialised knowledge and skills. Active involvement of social scientists with a strong background in livelihood and gender research and analysis is important to ensure that these perspectives inform the whole research process.

The involvement of researchers with local knowledge of culture, values and norms, strong interviewing and facilitation skills, and experience engaging with disenfranchised groups is important. In some contexts, sharing certain characteristics with respondents, say gender or ethnicity, may make all the difference in terms of the range and quality of the data collected.

To ensure a coherent, chain-wide perspective, one person should lead the different stages in the process, from study design to data collection, analysis, and reporting. The active involvement of the team leader during all fieldwork stages is particularly important in view of the need to adjust survey samples and tools, and allow for discussions with respondents to be informed by previous interviews along the production and marketing continuum.

Focus Group Discussion with urban consumers in Myanmar.
Photo: Helvetas/Ngoc Anh

Collecting data using mobile devices in Pakistan.
Photo: ACIAR/ConorAshleigh

# Tool 1
# Prioritising Value Chains

# Introduction

Many value chain projects start by selecting a sub-set of promising sectors, value chains, or products for further detailed analysis and possible development. In the context of this toolbook, agricultural value chains are prioritised with a specific emphasis on potential to improve competitiveness and improve incomes and livelihoods of key chain participants, particularly the poor or other marginalised groups.

Selling high value fruit such as Durian and longan from a roadside stall in Cambodia.
Photo: ©2009CIAT/NeilPalmer



Typically, a well-defined set of assessment criteria are used to prioritise and select value chains from an extensive list of potential options. Relevance to target groups, including women and men, market size and growth, competitiveness, upgrading opportunities, and environment and climate impacts. Additional criteria, indicators, and relative weightings can be used to reflect the specific focus, purpose, and objectives of a project or organisation.

Upgrading quality has enabled cocoa farmers in Vanuatu to access international markets for premium, single-origin chocolate and receive higher prices.
Photo: Conor_Ashleigh©2014

# Objectives

The main objectives of this chapter are to:

- Identify key criteria and indicators to evaluate value chains in relation to project goals
- Understand the process of systematically evaluating and prioritising value chains with greatest potential to benefit target groups.

# Steps

Four steps can be followed to prioritise and select value chains:

1. Identify a list of potential products or value chains
2. Determine relevant selection criteria and indicators
3. Assign relative weightings
4. Score and rank value chains against selection criteria

The final selection of products or value chains can be determined from the ranking obtained from the four-step process outlined above.

This process should ideally adopt a participatory and iterative approach, involving relevant value chain stakeholders such as researchers, development practitioners, government staff, private sector firms, and community or farmer representatives.

It should also be supported by systematic analysis of evidence from secondary sources. Depending on the purpose, time, and resources, the prioritisation process can be applied pragmatically as a rapid appraisal tool, or as a more comprehensive approach that is informed by rigorous, in-depth secondary research.

Target groups should not be treated as a homogenous mass of people, all with similar characteristics. Rather, it is important to recognise the diversity that exists within and between actors and groups of impoverished men and women, ethnic minorities, or farming communities. Underlying socio-economic contexts and asset endowments, including knowledge and know-how - will directly influence the needs and capacity of individuals or groups, and how they might participate in, or benefit from, different value chain interventions.

## Step 1
## Identify potential value chains and products

Potential value chains first need to be identified and listed. Commodities that are already produced in the country or region are an obvious choice. The list should also include niche products, or commodities not yet produced, but that have potential in terms of local agro-climatic conditions, market opportunities, and benefit to target groups, such as smallholder men and women farmers, the poor, or ethnic groups.

As shown in the examples in Box 1 below, the list of potential products or value chains can be developed in a participatory manner, involving key informants with a good understanding of agriculture, agribusiness and value chains, and social and cultural contexts in target countries or



regions. Such individuals may come from the farming and agribusiness sectors, academia, research centres, national and local government agencies, donor agencies, non-government organisations, or projects. Gender balance in the participants should be considered to reflect ideas from women's and men's perspectives.

**Box 1: List of crop and livestock options for more profitable and sustainable farming systems in Son La, Vietnam**

A prioritisation of value chains for more profitable and environmentally sustainable maize-based farming systems in Son La, a mountainous province in northern Vietnam, was conducted in 2017, under an ACIAR-funded project.

Project researchers first developed a product list based on a review of documentation from past conservation agriculture projects in Son La. This list was subsequently refined during a stakeholder validation meeting involving national maize researchers and provincial and district agricultural staff.

The final result was a long list of 29 product options with potential for improving soil fertility and reducing soil erosion, including 14 intercrop or relay crops, six perennial intercrops, six forage species, and three livestock types. These options were later ranked on the basis of market accessibility, riskiness and potential impacts on smallholder livelihoods.

Source: Value Chain Prioritisation Exercise, ACIAR Project SMCN/2014/049 Improving Maize-based farming systems on sloping lands in Vietnam and Lao PDR.

Maize value chains that supply animal feed markets provide income for thousands of poor households throughout the mountainous regions of northern Laos and Vietnam. ©2009CIAT/NeilPalmer

## Step 2
## Determine selection criteria

The selection of value chains for in-depth analysis and possible intervention should be based on a set of criteria that enable different value chains to be evaluated and compared using the same metrics. The purpose is to use criteria and indicators that will lead to identifying the most promising value chains for achieving the project goals. Involving stakeholders in the final choice of criteria will help build a common understanding and consensus around chain selection results.

A suggested chain selection framework is presented in Table 1, with a proposed set of indicators organised around **five main criteria:**

1. **relevance** to target groups;
2. **market** size and growth;
3. **competitiveness** of target groups;
4. chain **upgrading** opportunities; and
5. **environment and climate** impacts.

These criteria aim to integrate the factors influencing the relevance, opportunity, and feasibility of various value chain options to target groups. Other criteria and indicators can be added to reflect the specific focus, purposes, and priorities of a project or organisation, as shown in Table 1.

### Terminology

- **Criteria** are a distinguishing set of elements, conditions or processes by which a specific outcome is judged or evaluated against; e.g. market size and growth potential
- **Indicators** measure the specific quantitative and qualitative attributes of various criteria

**Table 1 next page**



**Table 1. Criteria and indicators for evaluating and prioritising value chains**

| Criteria | Indicators |
|---|---|
| **1.Relevance to target groups** | 1.1 Number of women and men currently or potentially involved in the chain |
| | 1.2 Contribution to incomes and livelihoods of target groups |
| **2. Market size and growth** | 2.1 Market size |
| | 2.2 Market growth (last five years) |
| **3. Competitiveness of target groups** | 3.1 Agro-climatic suitability and feasibility |
| | 3.2 Share of domestic market supplied by domestic producers and by target groups (last five or 10 years) |
| | 3.3 Share of domestic production exported (last five or 10 years) |
| | 3.4 Ability of target groups to compete on price and quality, or other product attributes such as food safety, geographic origin, or provenance |
| **4. Opportunities for chain upgrading** | 4.1 Opportunities for technical, process, linkage, organisational or product upgrading that increase productivity, efficiency, and value, and result in higher profits and net incomes for target groups |
| | 4.2 Likelihood of upgrading innovation, adoption, and practice change by target group |
| | 4.3 Presence of lead-firms and opportunities for inclusive agribusiness-led coordination and development |
| **5. Environment and climate impacts** | 5.1 Impact on the environment or opportunity to improve sustainability or mitigate negative impact |
| | 5.2 Impact on climate change and opportunity for adaptation or mitigation |
| **6. Other possible criteria (depending on context and purpose)** | 6.1 Alignment with government strategies, priorities, and regulatory frameworks |
| | 6.2 Policy risks and opportunities |
| | 6.3 Importance for food security and nutrition |

Guangzhou wholesale produce market in southern China is a major trading hub for national and global food value chains. Photo: FocusGroupGo/RoddDyer

## Step 2
## Determine selection criteria
(Continued)

The indicators chosen for criteria ideally should be measurable or objectively assessable (e.g. number of people in target groups, contribution to household income, market size, five-year market growth, yield potential, etc.). This will strengthen the rigor of scoring and analysis, reduce subjective assessments, and enable more objective comparison between value chains. Where qualitative indicators are used, providing guidelines for different scores will help to consistently assess criteria.

**Relevance to target groups** refers to the number of people (current or potential) involved in production and post-production, and the contribution the value chain makes to their income. Value chains and products and products that contribute significantly to household incomes and livelihoods may be strong candidates for in-depth analysis and possible intervention. However, a dependence on low-value crops or products may be associated with poverty traps for some of the population if they only provide a meagre income to the household. In such cases, diversifying into higher-value crops or products may be a better alternative to increase household income.

Population, agricultural, and household socio-economic statistics may provide the information required to estimate the number of households and people involved in different value chains, and the contribution they make to household income. Average product yields and price statistics can be used to estimate gross income. These statistics are often available at provincial, district, and commune or township administrative levels.

**Market size and growth** is equally important. Value chains servicing large, growing, and profitable markets, which the target group can access or participate in, are more likely to offer better opportunities for achieving positive socio-economic impacts at scale. Distinctions should be made between mainstream commodity markets and niche markets, which may provide diverse opportunities and benefits to different groups and numbers of people. For example, some value chain opportunities, such as the production of “safe vegetables” or aromatic rice, may relate to higher value niche markets within the broader market. This requires a more detailed analysis of different market segments.

Agricultural and trade statistics reporting current and recent changes in crop or commodity areas (ha), production output (tons), value ($) and unit price ($/ton), and exports and imports (tons and $) provide useful indicators of the market situation.



**Competitiveness** is another critical impact dimension. Target groups and agri-enterprises can only maintain or increase their market presence if they can compete in domestic and/or export markets. **Agro-climatic feasibility** describes the suitability of the local soil, topographic, vegetation, water, and climatic characteristics for the value chain crop and product. These factors directly influence the current and potential product yields, quality, and cost of production. **Enterprise-level measures** of competitiveness include production and marketing costs ($/kg), as well as attributes of product quality, safety, traceability, and provenance (e.g. price, $/kg). Import and export levels and trends are other useful sector-level indicators of competitiveness. Agricultural and market statistics and reports can provide the necessary data to evaluate competitiveness.

Competitiveness is not a static dimension. **Chain upgrading and innovation** refers to the opportunity to improve efficiency, competitiveness, value and net incomes in the value chain. The availability of specific practices, processes, innovations and technologies able to improve production or marketing efficiency (i.e. reduce cost of production; $/ton output), increase product output (tons) and quality (price/kg), and access higher-value markets should influence the selection of value chains.

Herr et al.[1] divide upgrading strategies into process upgrading, product upgrading, functional upgrading, channel upgrading and inter-sectoral upgrading. These strategies are described in more detail in Value Chain Upgrading (Tool 8). Upgrading strategies will vary greatly in their complexity, capital requirements, risk, and returns on investment. The costs and net-returns will also vary between innovations, actors, and groups in the chain.

### Terminology

- **Competitive Advantage** is where a value chain actor can produce a product at a lower price than competitors or produce an alternative substitute product that is more desirable. The two principal components of competitive advantage are comparative advantage and differential advantage.
- **Comparative Advantage** is where a value chain actor can produce a product more efficiently than other competing actors and hence offer it at a lower price.
- **Differential Advantage** is the ability of a value chain actor to produce an alternative substitute product that is more desirable than the products of its competitors.

## Step 2
## Determine selection criteria
(Continued)

The **likelihood of adoption and practice change** of upgrading innovations by different target groups is an important selection indicator. It is also complex and highly variable amongst target groups. Estimates of the proportion (%) of the target population likely to adopt specific technologies is a useful indicator. Actual adoption rates, for even relatively simple, easily implemented technologies such as improved varieties, are often below 40% - even after several years.

Assessments should consider specific barriers to adoption (e.g. finance, land, labour and/or knowledge requirements; cash flow; risk). They should also consider the social-cultural and economic relevance and feasibility of upgrading strategies and whether they are aligned with the livelihood strategies, priorities and aspirations of the women and men in target groups. It is important that target groups have the necessary endowments of physical, financial, natural, human, and social assets to take advantage of upgrading opportunities[2]. Possible imbalances in the capacity of women to benefit compared to men should also be considered.

The **presence and influence of lead firms** in the value chain can provide smallholder farmers access to new markets, technologies and information, or employment opportunities. However, it's also worth noting that the entry of lead firms into some areas can disrupt local dynamics through exclusionary effects. They may also create dependencies, requiring farmers to specialise to meet lead firm needs and requirements, from which they may no longer benefit if these firms were to exit[3] .

Possible indicators of lead firm influence on smallholders could be the amounts or proportion of inputs they supply, or product they source for processing or export. The prices they offer, the employment they provide, and the technical and financial support they deliver to farmers are other useful indicators.

**Environment and climate indicators** refer to expected impact or risk associated with the value chain on the environment and the contribution to climate change. Deforestation, water, air and soil pollution and greenhouse gas emissions are all important measures of possible environmental and climate impact and sustainability. Value chains or activities may also provide the opportunity to enhance positive environmental externalities and mitigate negative impacts.

1. M. Herr et al., *Explaining Concepts. A Guide for Value Chain Analysis and Upgrading*, Geneva, ILO, 2006, pp. EC-1-EC-23, cited in https://www.marketlinks.org/good-practice-center/value-chain-wiki/upgrading-overview
2. D. Stoian et al., 'Value chain development for rural poverty reduction: a reality check and a warning', *Enterprise Development and Microfinance*, vol. 23, no. 1, 2012, pp. 54-69.



**Other criteria** may be added to the list, depending on the context. For example, the extent to which potential chains are aligned with government strategies and priorities merits consideration in certain political and institutional contexts.

The designated criteria should reflect the mandate and priorities of the organisations involved, as well as the specific purposes of the value chain study.

An organisation such as the United Nations Industrial Development Organization (UNIDO), with a mandate to support industrial development, will tend to favour the selection of agri-food chains with a strong presence of processing enterprises, or that offer opportunities for agro-industrial development. The International Labour Organization (ILO) will be particularly sensitive to value chains with strong employment generation potential, or where labour issues are important. The United Nations Conference on Trade and Development (UNCTAD) may choose to target chains with strong export orientation or potential.

Decision-makers are often tempted to use a long list of criteria to rank value chain options, as shown in some of the examples presented later in this section. There are advantages, however, in working with a smaller number of criteria and indicators. This will reduce data requirements and ensure that key criteria have sufficient weight in the final choice of value chains.

Ultimately, the choice of criteria will be determined by political and institutional factors, the specific purposes and focus of value chain assessments, and the thinking and views of those involved. These factors explain why value chain selection criteria may differ considerably across organisations and projects, as shown in the examples presented in Boxes 2 and 3.

To apply a stronger gender and social inclusion lens in value chain analysis, there are some excellent examples from Jones (2016)[4] and others which are provided in Boxes 2-5 below. These propose different selection criteria or guiding questions that specifically address the potential for women's empowerment and gender equality. There are also useful guidelines and practical tools which have been developed to mainstream gender in analytical frameworks for value chain studies. It is important to remember that the presence and roles of women and men, and the barriers and opportunities they face, will vary between and within value chains, but may not be immediately visible.

3. E. Biénabe et al. (eds), Reconnecting markets - *Innovative global practices in connecting small-scale producers with dynamic food markets,* London, Gower, Gower Sustainable Food Chains Series, p. 208.
4. L. Jones, *The WEAMS framework women's empowerment and markets systems concepts, practical guidance and tools*, 2016, https://beamexchange.org/resources/794/.

## Step 2
## Determine selection criteria
(Continued)

**Box 2: Criteria for selection of pro-poor value chains in eastern Indonesia**

The Eastern Indonesia Agribusiness project[5] was developed to inform the selection of value chains and the design of value chain interventions in a development program that aimed to increase net incomes of at least 300,000 smallholder farm households by 30% in four provinces of eastern Indonesia by 2018.

The project team and the reference group jointly developed the chain selection criteria in the list below. There is a strong focus on the scope and opportunities for increasing the incomes of poor farm households. Additional criteria include environmental sustainability, agro-ecological feasibility, compatibility with government and donor-funded programs, and availability of infrastructure.

**1. Poverty alleviation and sustainability of the economic activity**

1.1. Is there potential to reach large numbers of poor households in production and post-production?

1.2. What is the potential to sustainably increase producer incomes?

1.3. Does the chain/commodity fit with the focus of government programs and priorities?

1.4. How project-crowded is the sector? To what extent are sector needs addressed by current donors?

1.5. What is the agro-ecological feasibility of the commodity?

1.6. Is the commodity environmentally sustainable?

1.7. What are the external risks?

**2. Chain structure**

2.1. Is there potential for production/post-harvest value addition?

2.2. What is the potential for improving market access?

2.3. What is the scalability and transferability potential?

2.4. Is there sufficient infrastructure available?

5. Australian Centre for International Agricultural Research (ACIAR) - *Eastern Indonesia Agribusiness Development Opportunities (EI-ADO)*, https://ei-ado.aciar.gov.au/



**Box 3: Agri-ProFocus criteria for gender-sensitive selection of value chains**

The framework for gender-sensitive selection of agricultural value chains developed by Agri-Pro-Focus[6] comprises ten indicators related to value chain competitiveness and growth potential, and another ten indicators relating to the potential for increasing women's empowerment and gender equality.

**A. Growth potential**

1. Positive growth trend of the value chain, unmet market demand
2. Available sales outlet, high interest of buyers in the product
3. Scope for expanding production and/or value addition through processing or product improvement (new products for which there is a market)
4. Low costs of the value chain vis-à-vis competitors
5. Other competitive advantage of the value chain vis-à-vis competitors (unique product/local specialty)
6. Potential for collaboration and coordination between actors for value chain upgrading
7. Sufficient technological and managerial level of enterprises in the sector for upgrading and innovation
8. Access to infrastructure, qualified labour force, raw material, inputs
9. Sufficient access to financial services
10. Sufficient access to business development services for quality improvement of the production process

**B. Potential to contribute to increased women empowerment and gender equality**

1. High share of women employed in the value chain as compared to the economy at large
2. High number of women entrepreneurs in the value chain
3. Women control equipment/ assets
4. Women have or can acquire skills needed for profitable value addition opportunities through processing product & diversification
5. Women control the sales income and the enterprise
6. Close to household within community area (geographically)
7. Low-entry barriers for small-scale and poor entrepreneurs (small production scale, low start-up costs, not requiring major capital investment, using low-tech skills)
8. Low-entry barriers for entrepreneurs (time and mobility, access to technology and assets, cultural constraints)
9. Offering new opportunities for women
10. New activities are in line with livelihood conditions (year-round income, using family labour, rapid returns, contributing to food security, keeping the environment intact, not reducing availability of clean water)

6. A. Senders et al., 'Gender in value chains - Practical toolkit to integrate a gender perspective in agricultural value chain development', *Agri-ProFocus*, 2014, https://agriprofocus.com/upload/ToolkitENGender_in_Value_ChainsJan2014compressed1415203230.pdf

## Step 3
## Weighting selection criteria

Once the chain selection criteria and indicators have been agreed upon, relative weightings of importance can be attached to each of them. This is done when some criteria are considered more important than others and should therefore have greater influence over the overall ranking or prioritisation of value chains.

Weightings are commonly assigned in two main ways:

- **Simple numeric** (for example, 1, 2, 3 or 4), where the relative importance of indicators are in direct proportion to the numeric weighting. This means that an indicator with a weighting of 4 is considered twice as important as one with a weighting of 2, and four times as important as a weighting of 1.
- **Proportional**, where all indicators have a combined weighting of 100% and the relative importance of each indicator is reflected in the proportion of the total weighting assigned to it. For example, if there are three indicators, then the first could be weighted 50%, the second 30%, and the third 20%.

If the choice of criteria and indicators is done in a participatory manner, with the involvement of selected stakeholders, then it is only natural that the same individuals also have a say in the attribution of weights to different criteria. This was the case of the EI-ADO study in eastern Indonesia discussed in Box 4 below.

### Take Note

Regardless of which weighting system is used, a rough rule is that the more pro-poor, gender-sensitive or socially inclusive you wish the selection of value chains to be, the higher the weighting that should be given to indicators that emphasise these dimensions.

**Box 4: Proportional weighting for selection of pro-poor value chains in eastern Indonesia**

For the selection of value chains in eastern Indonesia, discussed in Box 2, the EI-ADO project team and reference group decided to assign proportional weights to each set of criteria and then to individual criteria, as shown in the table below.

Poverty reduction and sustainability of the economic activity accounted for 60% and chain structure for 40% of the total value chain scores. The weights subsequently assigned to each criterion reflected the focus on pro-poor impacts, with the potential to reach large numbers of poor households and to sustainably increase their income receiving the highest weights, followed by the potential for value addition, the potential for improving market access, and the scalability of innovations.



**Box 4: Proportional weighting for selection of pro-poor value chains in eastern Indonesia**

| Criteria | Weight |
|---|---|
| **Poverty reduction and sustainability of the economic activity** | **60%** |
| Is there potential to reach large numbers of poor households in production and post-production? | 30% |
| What is the potential to sustainably increase producer incomes? | 30% |
| Does the chain/commodity fit with the focus of government programmes and priorities? | 10% |
| How project-crowded is the sector? To what extent are sector needs addressed by current donors? | 5% |
| What is the agro-ecological feasibility of the commodity? | 10% |
| Is the commodity environmentally sustainable? | 10% |
| What are the external risks? | 5% |
| **Chain structure** | **40%** |
| Is there potential for production/post-harvest value addition? | 30% |
| What is the potential for improving market access? | 30% |
| What is the scalability and transferability potential? | 25% |
| Is there sufficient infrastructure available? | 15% |

Source[7]

7. ACIAR, *Eastern Indonesia Agribusiness Development Opportunities (EI-ADO)*, Australian Centre for International Agricultural Research, https://ei-ado.aciar.gov.au/

**Box 5: Proportional weighting for gender-sensitive selection of value chains in three regions of Albania**

A simpler weighting method was adopted in the FAO project in Albania, Advancing Rural Women's Economic Empowerment through Income Diversification. Weights were attributed to aggregated criteria rather than individual indicators, with opportunities for intervention and relevance for women's empowerment weighing slightly more than market demand and outreach. National priority ranking, in contrast, received a low weight.

| Criteria | Weight |
|---|---|
| **Market demand and potential**<br>• Importance of the sub-sector to regional development<br>• Evidence of high market potential or strong effective demand<br>• Positive growth prospects and opportunities for income and employment<br>• Assumed (potential) competitive advantage of a sub-sector in relation to the regional, national, and international market | 20% |
| **Outreach**<br>• Number or significance of SMEs in the sub-sector and their distribution along the value chain<br>• Estimated employment in the sub-sector (disaggregated by sex)<br>• Location of major clusters in the area | 20% |
| **National priority ranking**<br>• Government priority sector<br>• Potential demonstration effects, assumed spill-over effects, repeatability in other sub-sectors | 10% |
| **Opportunities for intervention**<br>• Existence of constraints/bottlenecks that could potentially be tackled in an efficient way<br>• Ease of entry and openness of key actors (private and public sectors) to cooperation<br>• Likelihood of stakeholder buy-in and active support to interventions | 25% |
| **Relevance for women's empowerment and cross-cutting issues**<br>• Location of women's cluster in the area<br>• High likely impact on poverty or socially excluded groups<br>• Likelihood of opportunities for women's economic empowerment<br>• Potential to add value to agricultural or other product<br>• Opportunities for networking<br>• Opportunities for diversification | 25% |
| **TOTAL** | **100%** |

Source[8]



## Step 4
## Scoring and ranking of value chains

Scoring is the final and most difficult step in the selection of value chains. It consists of rigorously evaluating how well the various chains match the criteria indicators, and scoring them accordingly. A specific indicator, or succinct descriptive narrative for each score, should be presented.

Different scoring scales can be used, but 1 to 5 is the most common. If weights have been assigned to the criteria indicators, the scores will need to be multiplied by their respective weights.

The value chains are then ranked according to their total scores, which can be calculated either as an average or the sum of individual indicator scores. A scoring matrix such as Table 2 is normally used for easy comparison between value chains.

**Table 2. Example matrix for scoring and ranking value chains**

| Criteria | Weights | Value Chain 1 | Value Chain 2 | Value Chain 3 | (...) |
|---|---|---|---|---|---|
| **Criterion 1** | | | | | |
| **Criterion 2** | | | | | |
| **Criterion 3** | | | | | |
| **Criterion 4** | | | | | |
| **(...)** | | | | | |
| **Total score (Sum or average)** | | | | | |

Ideally, an assessment and scoring of criteria should be based on sound evidence. The data and information used can vary significantly, depending on the time and resources allocated to the task. Researchers must first determine whether to rely exclusively on existing (secondary) data, or also conduct key informant interviews for additional (primary) information and insights. Typically, stakeholders will only be involved once the data has been collected, analysed, and used to score the different value chains. They will be called upon for validation, or just for sharing, of the value chain scores and ranking.

8. FAO, *Market and Value Chain Analysis of Selected Sectors for Diversification of the Rural Economy and Women's Economic Empowerment*, Food and Agriculture Organization of the United Nations, Budapest, 2018, http://www.fao.org/3/I8909EN/i8909en.pdf

Another possible approach is to base the whole exercise on the knowledge and views of a group of key informants and stakeholders, who come together to discuss and reach a consensus around the scoring of each chain. This option is less rigorous but quicker, cheaper, and more conducive to stakeholder involvement than a more data-driven approach. Stakeholders can be represented in the group responsible for scoring the value chains.

The examples presented in Boxes 6 and 7 show how approaches to value chain scoring may vary considerably.

**Box 6: Scoring and ranking of value chains in eastern Indonesia according to their potential to benefit the poor**

EI-ADO provides an interesting example of a thorough approach to value chain scoring, based on a comprehensive review of existing data and a series of stakeholder consultations.

A team of consultants and local researchers were involved for several months in a socio-economic review of the three target provinces and desk-based studies of the 16 potential commodities. Around the same time, the Indonesian project coordinator carried out a series of meetings in selected districts across the three provinces to introduce the project to local government and gather insights on provincial and district commodity priorities.

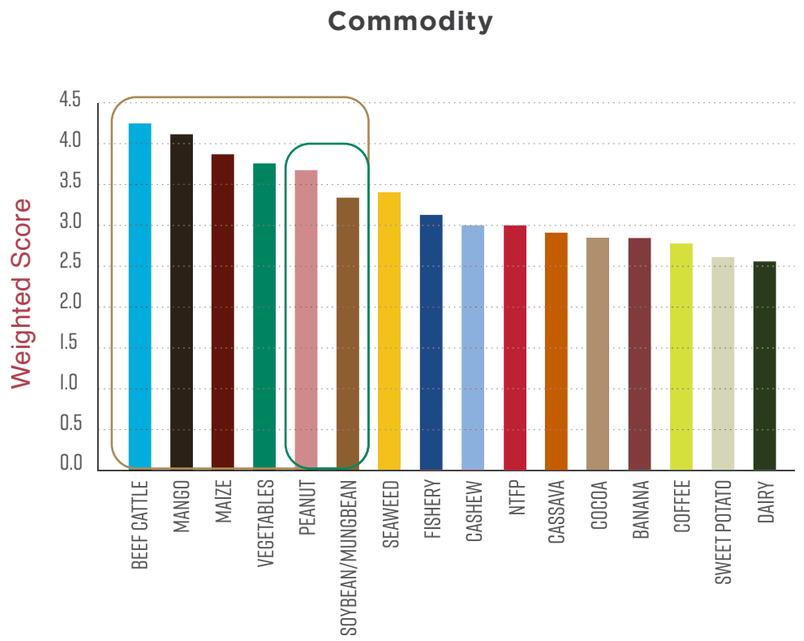
The meetings were followed by a priority identification workshop in Bali. Local agricultural and extension officers joined the project team and the project reference group to review the draft selection criteria, assess the data collected, and discuss commodity priorities. Following the workshop, the EI-ADO Reference Group concluded that the evidence available strongly supported the choice of beef cattle and mango as two of the five commodities that should be selected for in-depth value chain analysis.

Soon after, the project team organised another workshop to present a preliminary scoring matrix to the Reference Group, as well as the justification for scoring decisions. A scale of 1 to 5 had been used to assess the extent to which the potential value chains matched the different selection criteria, with final scores for each chain equal to the weighted average of individual criteria scores. After some revisions to the matrix, the Reference Group selected the five highest-scoring commodities for further study, with three different crops grouped under legumes. The final score and ranking results are presented in the diagram below.

Source[7]

Diagram next page






Source[9]

**Box 7: Scoring of value chains in three regions of Albania according to their potential to reduce poverty and empower women**

The FAO project Advancing Rural Women's Economic Empowerment through Income Diversification (see Box 5) relied on both secondary and primary data to prioritise value chains in three regions of Albania. From a list of eight value chains, three were to be selected for further research and analysis.

Two national experts first carried out a desk review of potential sectors and sub-sectors. The purpose was to generate an improved understanding of market and value chain dynamics, the actors involved, constraints and challenges, and the role of women.

The same experts conducted a series of key informant interviews and consultations focused on opportunities for employment of rural women and diversification of household incomes in the eight potential chains. A total of 28 informants were consulted in round table, formal meeting, group discussion, and interview settings, including national experts, local officials, value chain participants, and representatives from civil society organisations.

The data collected provided the basis for value chain scoring. Chains were scored from 1 to 5 against each selection criteria, with the final scores calculated as the weighted average of the individual criteria scores. As shown in the matrix below, medicinal and aromatic plants, beekeeping, and traditional food and gourmet ranked first, second and third, respectively (See table below).

9. ACIAR, *Eastern Indonesia agribusiness development opportunities – socioeconomic review and prioritisation of lead commodities*, Final report, Australian Centre for International Agricultural Research, 31 July 2012, https://ei-ado.aciar.gov.au/commodity-selection/commodity-prioritisation.html#quicktabs-tabs_commodity_prioritisation=1

## Scoring of value chains in Berat, Vlora and Korça regions

| | Weight (%) | Medicinal and aromatic plants | Beekeeping | Traditional and gourmet food | Rural and agro tourism | Trout and aquaculture | Olive oil and soap | Handicrafts (organic wool) | Dairy |
|---|---|---|---|---|---|---|---|---|---|
| **Market demand and potential** | 20 | 5 | 5 | 4 | 4 | 4 | 3 | 2 | 3 |
| **Outreach** | 20 | 5 | 4 | 3 | 3 | 3 | 4 | 2 | 4 |
| **National priority ranking** | 10 | 5 | 3 | 3 | 4 | 4 | 4 | 2 | 3 |
| **Opportunities for intervention** | 25 | 5 | 5 | 4 | 2 | 2 | 2 | 3 | 2 |
| **Relevance for women's empowerment** | 25 | 4 | 3 | 5 | 3 | 2 | 2 | 4 | 2 |
| **TOTAL** | **100** | **4.8** | **4.1** | **4.0** | **3.1** | **2.8** | **2.8** | **2.8** | **2.7** |

Source[10]

10. FAO, *Market and Value Chain Analysis of Selected Sectors for Diversification of the Rural Economy and Women's Economic Empowerment*, Food and Agriculture Organization of the United Nations (FAO), Budapest, 2018, http://www.fao.org/3/I8909EN/i8909en.pdf



# What Should be Known After the Analysis is Complete

After completing the prioritisation steps, a set of competitive value chains with potential to benefit target populations and groups should have been identified for analysis and development.

Chili is one of the most important vegetable value chains in Indonesia.
Photo: Oikoi

Developing more productive and competitive beef cattle value chains benefits thousands of poor rural households in Eastern Indonesia. Photo: ConorAshleigh-©2017-Indonesia

The rapid development of domestic and export vegetable value chains in Vietnam has enabled thousands of smallholder farmers to significantly increase their incomes. Photo: ACIAR/Vietnam

# Tool 2
# Mapping the Value Chain

# Introduction

After selecting value chains for analysis (Tool 1), the next step is to make an initial set of "maps" or diagrams of the value chain system.

Value chain mapping serves multiple purposes: it can guide data collection, help analyse and report information and communicate key findings, and assist the design and evaluation of interventions. While often described as a cumulative process culminating in a final chain diagram, value chain mapping can also be viewed as a tool for developing a preliminary understanding of key value chain dimensions for more in-depth subsequent analysis.

Mapping produces a visual representation of the key value chain processes, actors, activities, flows and external influences associated with transforming inputs into agricultural products, through to consumption in end-markets. A value chain map often represents processes for transforming inputs into a commodity or product in a simple linear market segment. In many cases, however, the processes and flows of a commodity or product into multiple markets and subsegments may need to be represented.

Mapping produces three main outputs:

1. A value chain map;
2. A summary value chain table;
3. Geographical maps of the value chain.

Fresh cassava roots are transported and unloaded at a starch factory in western Laos for processing and export to China.
Photo: FocusGroupGo/Rodd Dyer



These outputs help researchers and stakeholders visualise and better understand complex production, transformation and market systems and inter-relationships. Mapping also helps to visualise where target groups are located in the value chain, and the roles they play, and to identify various potential constraints and solutions along the value chain.

Value chain mapping aims to capture and represent information about the following key questions:

- What are the main end-markets or market segments?
- What are the core value chain processes?
- Who are the actors involved in these processes? Where are they located? What is their role? How many are there?
- What activities are carried out for each process? By whom?
- What is the flow, volume, value and margins of products along the chain?
- How is information and knowledge exchanged throughout the value chain?

Inclusive value chain mapping will especially explore questions about women and men, the poor or other disadvantaged groups, such as:

- Where are the poor or other target groups located in the value chain? What is their position and role? How many are there?
- Where are women and men located in the value chain? How many are there? What roles are performed mainly by women, men, or shared?
- Who has power and influence amongst actors and target groups?
- What are the external support services and markets influencing the value chain?
- What are the main constraints and opportunities for different value chain nodes and end-markets? Where are women and men most impacted, or likely to benefit?
- How are value chain product flows, processes, actors, and end-markets distributed geographically?

# Objectives

Value chain mapping aims to produce a visual representation or diagram of the value chain system, including the following key elements:

1. Interlinking processes, actors and influences - internal and external;
2. Product flows, volumes, and values;
3. Geographic (spatial) flow of products from inputs to final consumption;
4. Locations, roles and status of both genders, the poor, minority groups, or other target groups, and
5. Constraints and possible solutions at different levels in the value chain, and relevance to target groups.

## Take Note

The mapping dimensions covered in this tool are also included in other tools in this book. The difference between the treatment in the mapping tool and in the subsequent tools lies in the depth of the analysis. The mapping tool is designed to provide an initial overview of the critical aspects of the value chain. This initial overview will be used to guide the subsequent, more detailed analysis of the chain, based on the later tools in this book.

# Steps

## Step 1
## Map core process steps and market channels

The first step is to describe the main physical processes in value chains from input supply, production, collection and transport, processing, wholesaling, retailing, and exporting through to final consumption of products in different end-markets.

As a rough guide, try to distinguish a maximum of six or seven major processes that the raw material goes through before it reaches the final consumption stage, including the provision of inputs (e.g. fertiliser, seed, pesticides) to produce raw materials. These core processes will differ, depending on the characteristics and end markets of the chains being mapped: industrial products undergo different phases compared to agro-products or services. The example in Figure 1 shows a relatively simple linear value chain, with one final product (animal feed) produced from the raw material (maize).



Animal feed production absorbs a significant proportion of maize production in north-west Vietnam. Maize produced by smallholders is processed by medium- and large-scale companies into animal feed, which is then sold to livestock farmers through a network of wholesalers and retailers. As an example, the core processes in the animal feed value chain are represented below in a diagrammatic format.


Figure 1. Example of mapping core process steps

For many value chains, multiple products may be produced from the initial raw material, each of which may follow different processes and market channels to various points of consumption and end markets. In these cases, the process map will be more complex, and involve parallel sets of processes and end-markets. An example of this type of value chain is cassava, where the final product could be cassava chips for animal feed, or cassava starch for numerous end-uses.

An initial identification of different end markets and market channels should be made during this first step before multiple end-markets and channels are explored more explicitly in Step 2.

Maize grown in northern Vietnam and Laos is aggregated, shelled and dried in Son La province before being transported to feed mills near Hanoi.
Photo: FocusGroupGo/Rodd Dyer

## Step 2
## Identify and map the actors

The next step is to identify the main actors – groups of people with different process functions in the value chain. Key questions are: who are the actors involved in these process steps and what do they actually do? What is their role and function? What are the main subgroups within each group of actors? Which processes are undertaken by women, men, or shared?

A straightforward distinction is to categorise actors according to their main occupations. Typical value chain actors include input suppliers, producers, collectors, processors, wholesalers, exporters, importers, and retailers.

Actors can also be categorised into different sub-groups to capture more nuanced information. This is particularly important for understanding and developing pro-poor and inclusive value chains. Examples of different groupings include:

- Gender (women and men)
- Ethnicity (ethnic majority and minorities)
- Income, socio-economic group, or poverty status (poor, median, better off)
- Enterprise size or scale (micro small, medium, large)
- Legal status
- Remoteness or proximity to markets

It is also important to remember that some actors may perform several process functions. For example, some farmers may also be collectors and may even sell inputs to other farmers.

When applying a pro-poor, gender, or social inclusion lens, it is important to identify the position of various groups at different processes or levels in the value chain. In agricultural value chains, it is often assumed that the poor are all primary producers, but in fact they may be involved in many other processes, either as self-employed or as hired labour. Similarly, women and other disadvantaged groups may be concentrated at lower levels of the value chain or play less visible supportive roles. In some cases, women and men may be in the same group (e.g. farmers, traders) but have different roles or positions in relation to power and influence. It is important to recognise these differences as they may have important implications in terms of their needs, opportunities and constraints.

The actors are included in the **Value Chain Map** as a set of disaggregated actor types below the appropriate core process within the diagram. Different actors within a single process step can represent different market channels, as shown in Figure 2 for the maize value chain.



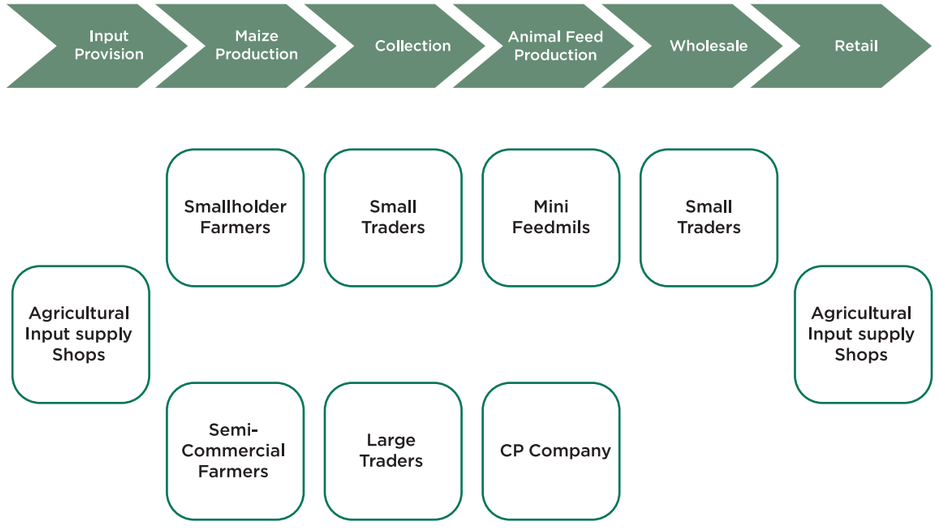



Figure 2. Actors and market channels incorporated into a Value Chain Map

Giving different colours to processes undertaken by men and women can be a simple and useful tool for making women visible and identifying their activities under the different value chain processes. The same procedure can be followed for different social groups within a value chain.

Figure 3 below shows how a social inclusion lens can be applied to mapping. In this value chain, ethnic minorities are the disadvantaged group. They own limited land, live in remote areas, and are poorer than the majority ethnic group.

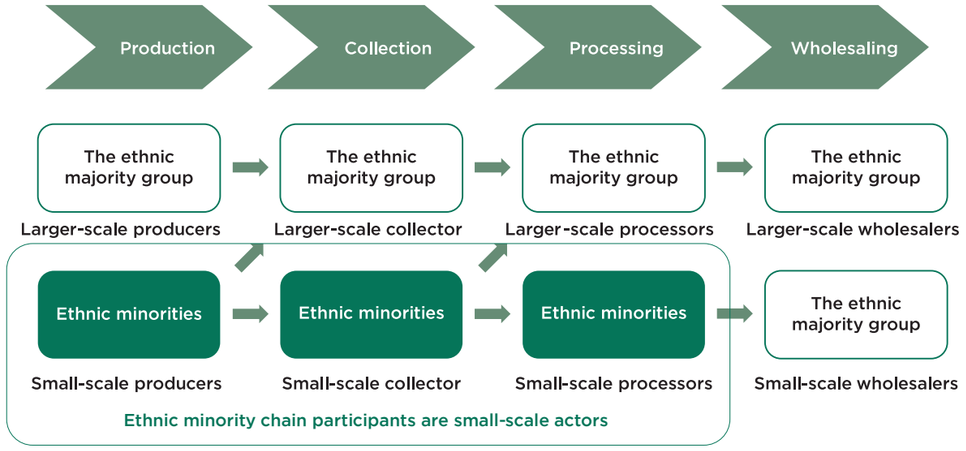



Figure 3. A fictional example of mapping actors and activities with a social inclusion lens

In the figure above, the minority group is concentrated in small-scale activities. In this case, if your value chain project only focuses on interventions with actors at a larger scale, minority people will be excluded, creating further economic gaps between the majority and the minority groups.

An example of how a gender and social inclusion lens can be applied to mapping is shown in Figure 4.

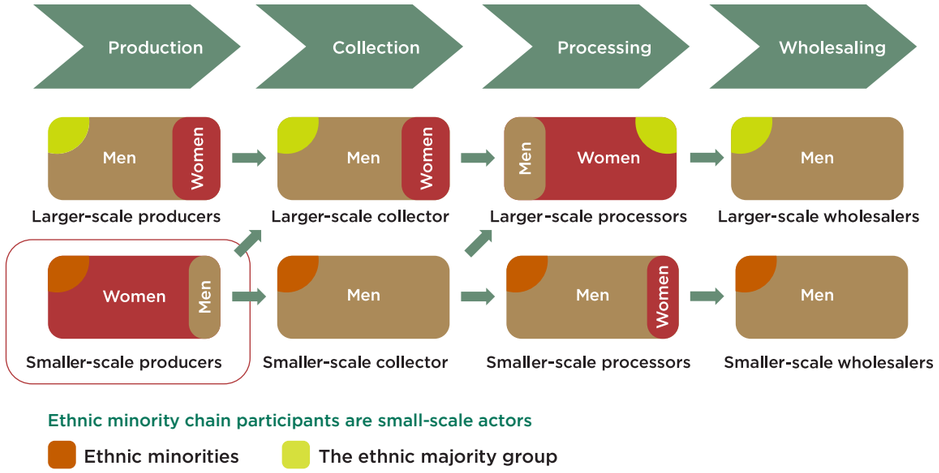



Figure 4. An example fictional case of the cassava value chain in northern Vietnam

In Figure 4, women from the ethnic majority group are actively involved in most value chain activities, although they might be playing supportive instead of leading roles. In contrast, ethnic minority women are only concentrated in small-scale production (see the red rounded box area). In the project planning, it is important to develop interventions for small-scale producers that can involve minority women.

The actors are included in the **Value Chain Table** as the second row of Table 1 referring back to the core process steps in the first row.

**Table 1. Including core process steps and actors in the Value Chain Table**

| Process Step | Production | Collection | Processing | Wholesaling | Retailing |
|---|---|---|---|---|---|
| Actors | Female farmers | Small scale (women and/or men) | Household processing (women and/or men) | Wholesalers (women and/or men) | Traditional retailers (women and/or men) |
| | Male farmers | Medium scale (women and/or men) | Commercial processing (women and/or men) | | Modern retailers (women and/or men) |
| | | Large scale (women and/or men) | | | |



## Step 3
## Map specific activities undertaken by different actors

This step involves breaking down the core processes into specific activities carried out by different actors. Mapping activities will provide an understanding of where there are gaps or overlapping activities, whether there is potential for upgrading, or what activities could be targeted to best support women or other groups.

Every value chain has its own core processes and specific activities. Typical activities for input suppliers might include ordering, re-packing, marketing, and delivery. Purchasing inputs, cultivation, planting, weeding, spraying, harvesting, storing, and selling would be typical activities for farmers. Procuring, assembling, storing, sorting, cleaning, grading, packing, transporting, and marketing might be activities carried out by collectors, wholesalers, and retailers.

Ideally, activities should be described for each of the actor subgroups and processes Table 2. When applying a social inclusion lens, it is important to identify which processes and activities different groups are concentrated around. Applying a gender lens examines whether specific processes and activities are predominately carried out by women, men, or both equally.

**Table 2. Value Chain Table, showing processes, actors and activities**

| Process | Production | Collection | Processing | Wholesaling | Retailing |
|---|---|---|---|---|---|
| Actors | Male farmers<br>Female farmers | Small scale<br>Medium scale<br>Large scale | Household processing<br>Commercial processing | Wholesalers | Traditional retailers<br>Modern retailers |
| Activities | Male farmer Activities:<br>Female farmer Activities: | Small scale collector activities:<br>Medium scale collector activities:<br>Large scale collector activities: | Household processing activities:<br>Commercial processing activities: | Wholesaling activities: | Traditional retailer activities:<br>Modern retailer activities: |

## Step 3
## Map specific activities undertaken by different actors
(Continued)

Again, it is important to keep in mind that some actors may perform several process functions; therefore, all activities should be described. For example, female activities may include: planting, watering, weeding and harvesting (producing functions); collecting products from other farmers (collecting function); and selling products in local markets (retailing function).

### Take Note

Breaking down core processes into specific activities is useful when we turn to analysing costs, revenues, and margins (see Tool 5). The activities can be seen as the cost or profit centers of value chain actors.

## Step 4
## Map the product flow, form and volume

Next, the flows and volumes of products that are transformed from raw materials to final products in main end-markets can be estimated and mapped. Including these products and flows in the Value Chain Table creates a clear picture of the product forms that are handled, transformed, and transported at each process stage Table 3. This is especially helpful if a researcher wants to know what stages are used to reach the final product.

**Table 3. Example of product flows in the pig value chain in Ben Tre, Vietnam**

| Process | Inputs to sow-piglet production | Sow-piglet production | Fattening | Procurement | Processing | Consump-tion |
|---|---|---|---|---|---|---|
| Input Form | | feed, medicine, replace-ment sows | weaners | fattened pigs | fattened pigs | offal |
| Output Form | Feed, veterinary medicine, replace-ment sows | weaners | fattened pigs | fattened pigs | pork, offal | |



Volumes can be described in relative (%) or absolute (tons) terms, depending on the information available, but are often indicative estimates. Arrows - indicating the volume or proportion of product at each core process level that flows between different actors - are added to the Value Chain Map. This will show the relative size of the different market channels within the value chain. The following example (Figure 5) maps volumes as a proportion of the total volume of the whole sub-sector.

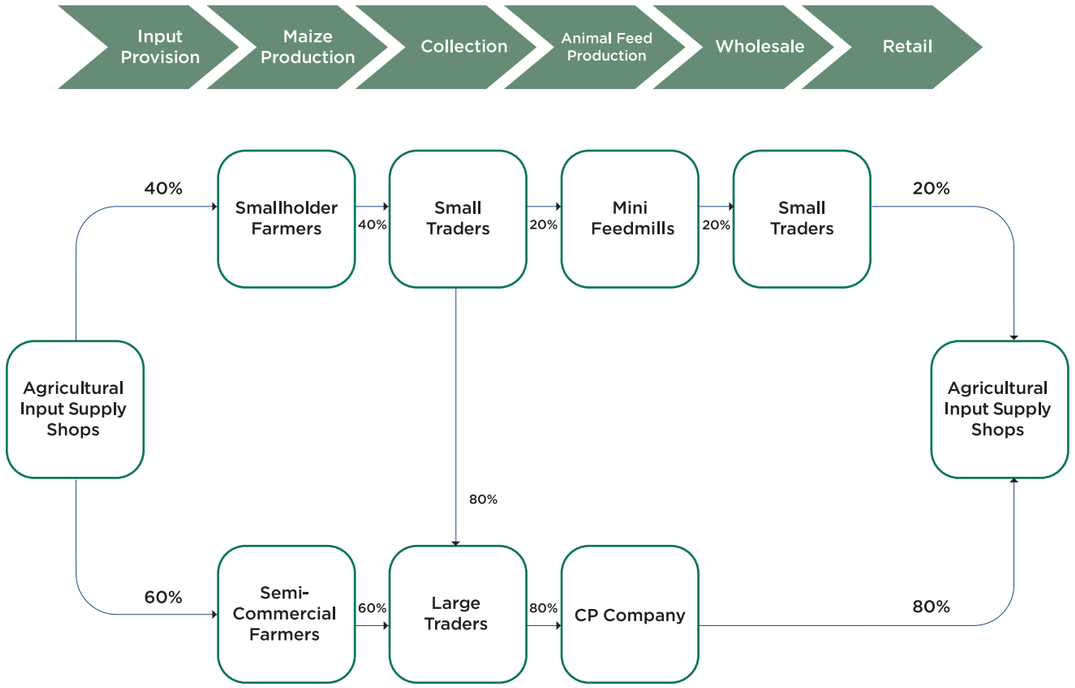



Figure 5. An example of adding volume proportions to the Value Chain Map

## Step 5
## Map the product value

Product unit prices (e.g. $/kg) at each process step in the chain can be used to map value. More specifically, the differences in unit prices between process steps are indicative of the monetary value addition along the chain. When unit prices are multiplied by estimated product volumes, the monetary value at each step of the chain can be estimated. See for example the prices, costs and value added calculated for the fresh cassava root value chain from Cambodia to Vietnam in Table 4 below.

However, these price indicators do not tell us anything about the cost of production and distribution, and cannot therefore be used as profitability or net income measures. These will be discussed in more detail in Tool 6.

**Table 4. Prices, costs, and value added along the fresh cassava root value chain, Kratie/Tay Ninh 2016-2017 (US$/tonne)**

| | Purchase Price | Costs | Selling Price | Gross Margin | Net Margin |
|---|---|---|---|---|---|
| **Cambodian farmer** | | 45.74 | 50.80 | | 5.06 |
| **Cambodian small trader** | 50.80 | 1.00 | 54.11 | 3.31 | 2.31 |
| **Cambodian large trader** | 54.11 | 3.51 | 61.84 | 7.73 | 4.22 |
| **Vietnamese trader** | 61.84 | 6.76 | 75.09 | 13.25 | 6.49 |
| **Vietnamese factory** | 75.09 | | | | |
| **Total net value added up to factory gate (US$/ton)** | | | | | **18.08** |

Source: Estimated from information obtained from in cassava Farmer Focus Groups in Kratie Province (June 2016). Interviews with small and large cassava traders in Kratie Province (June 2016) and interviews with traders and brokers at Chang Riec and Xa Mat border gates (April 2017)[1]

The value of products can be included in the Value Chain Map by showing unit prices at the linkage arrows between each value chain actor, as shown in Figure 6. This enables easy identification of differences in input and output unit values between different actor categorisations (for example, smallholder farmers and semi-commercial farmers).

1. J. Newby and R. Cramb, *Developing value-chain linkages to improve smallholder cassava production in Southeast Asia*, Discussion Paper, no. 3, May 2018.



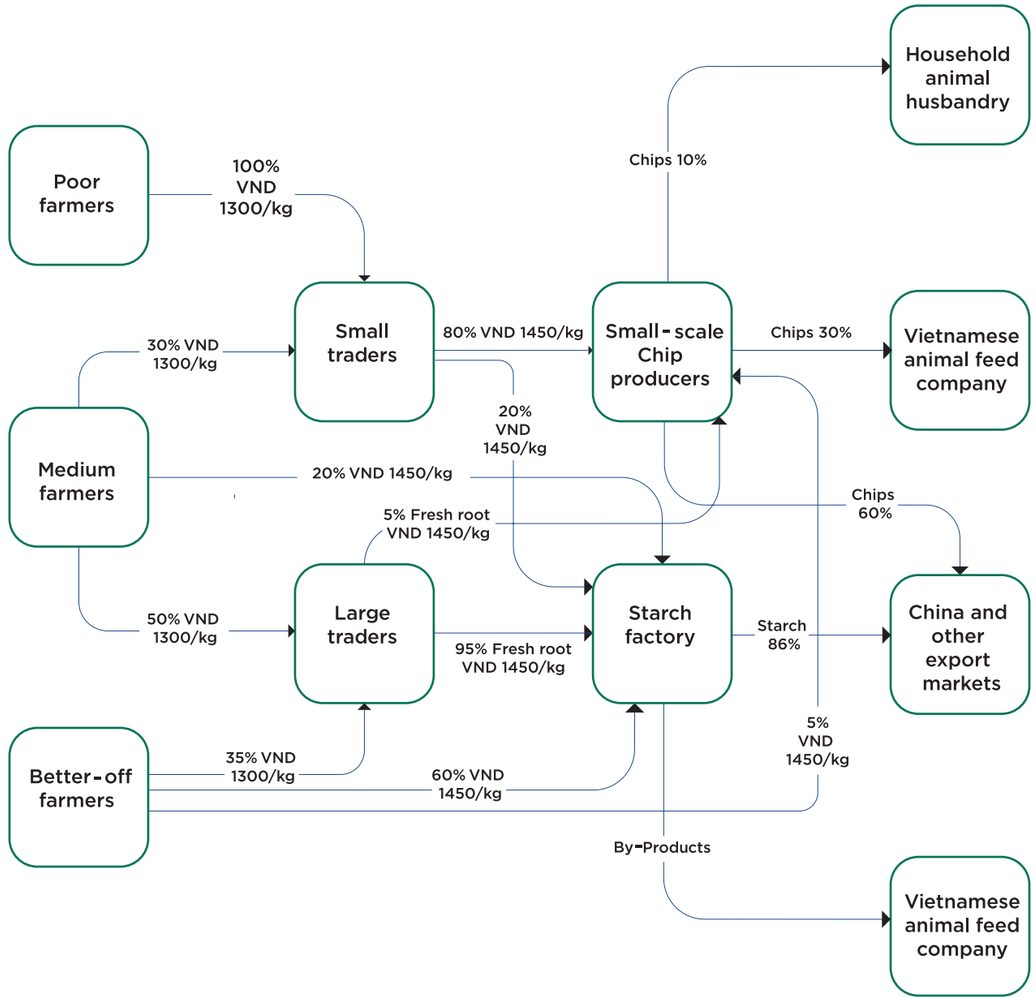



Figure 6. Volumes, prices and product form included in a Cassava Value Chain Map
Source[2]

### Take Note

It is important to recognise that at the mapping stage of the value chain analysis, very little accurate information may be known about costs at different process levels. Most likely, only price information at each process level will be available.

2. J. Newby and R. Cramb, *Developing value-chain linkages to improve smallholder cassava production in Southeast Asia*, Discussion Paper, no. 3, May 2018.

## Step 6
## Map relationships and linkages between actors

Mapping relationships and linkages describes how actors interact and transact with each other. Vertical relationships exist between different process steps (e.g. between producers and traders). Horizontal relationships exist within the same process step (e.g. farmer to farmer).

Relationships or linkages between actors can be mapped according to four broad categories:

1. **Spot market relations:** These are transaction relationships that are created 'on the spot'. The buyer and seller meet, negotiate on price, volume, and other requirements; and come to an agreement (or not). This is a very common vertical coordination arrangement in traditional agricultural marketing systems in developing countries.

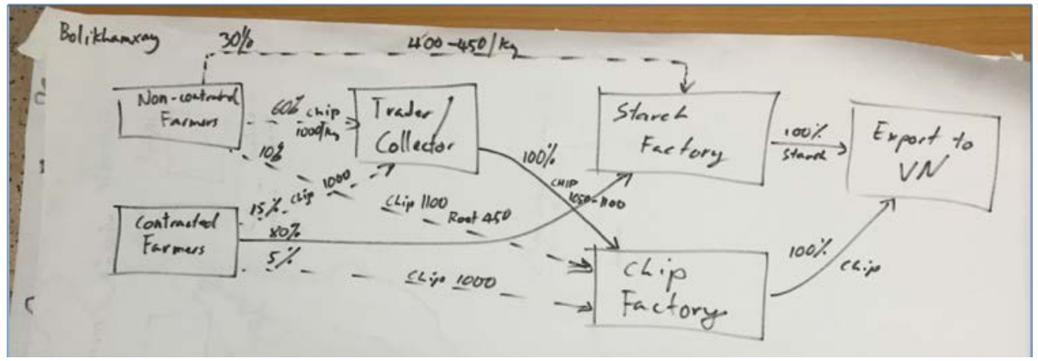
2. **Persistent network relations:** Two actors are in a persistent network relation when they transact with each other over time. This comes with a higher level of trust and interdependence. A persistent network relationship can be formalised by contracts, but this is not a necessity.

3. **Vertical integration:** This goes beyond the definition of a 'relationship', since the same organisation (this can be an enterprise or a cooperative) is integrated vertically, undertaking various processes throughout the value chain.

4. **Horizontal integration:** This refers to collaboration between different actors undertaking the same process step within a value chain. An example of this would be a cooperative providing a mechanism for integration between farmers.

In order to map the relationships between actors, different types of lines and arrows can be added to the Value Chain Map. Figure 7 shows a **Value Chain Map** for cassava in Lao PDR – the top section shows the map as drawn on A0 paper by participants in a mapping workshop, while the lower section reproduces the map as drawn using the DrawExpress App. The map includes information about the value of the product at each process level within the value chain, the proportion of product flowing between each actor type, and the type of relationship (persistent or spot) between different actors.





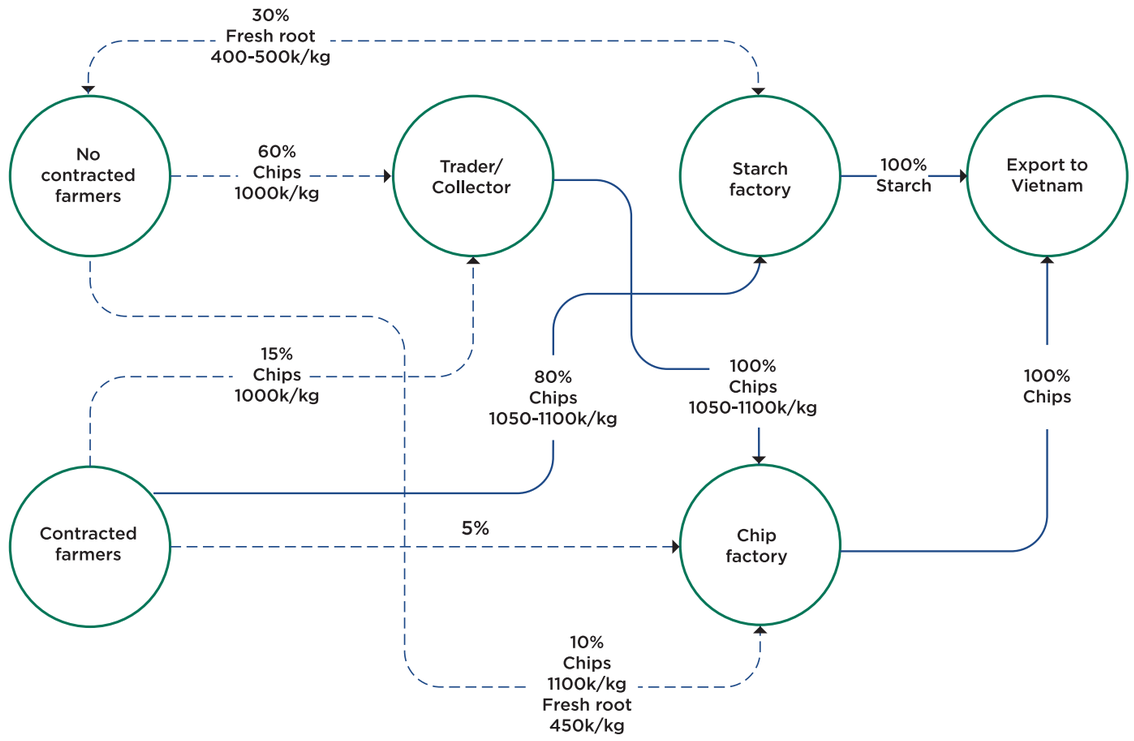




Figure 7. Completed Value Chain Maps for cassava fresh roots, chips and starch - Dotted line represents spot market relationship and solid line represents persistent relationship. Source: Mapping Exercise for Cassava Value Chain Lao PDR[3]

3. V. Manivong et al., *Value Chain Analysis, Household Survey and Agronomic Trial Results - Lao PDR*, Discussion Paper, no. 5, July 2018. http://cassavavaluechains.net/wp-content/uploads/2018/07/discussion-paper-number-5-2.pdf

## Step 6
## Map relationships and linkages between actors

(Continued)

When considering gender and social inclusion, it is vital to understand whether there are any differences in the relationships between more and less advantaged social groups, and between women and men. These differences would need to be taken into account when developing interventions designed to lead to more inclusive value chains.

Figure 8 shows an example mapping of actors' relationships and linkages with a gender and social-inclusion lens in the fishery value chain in coastal Kenya.

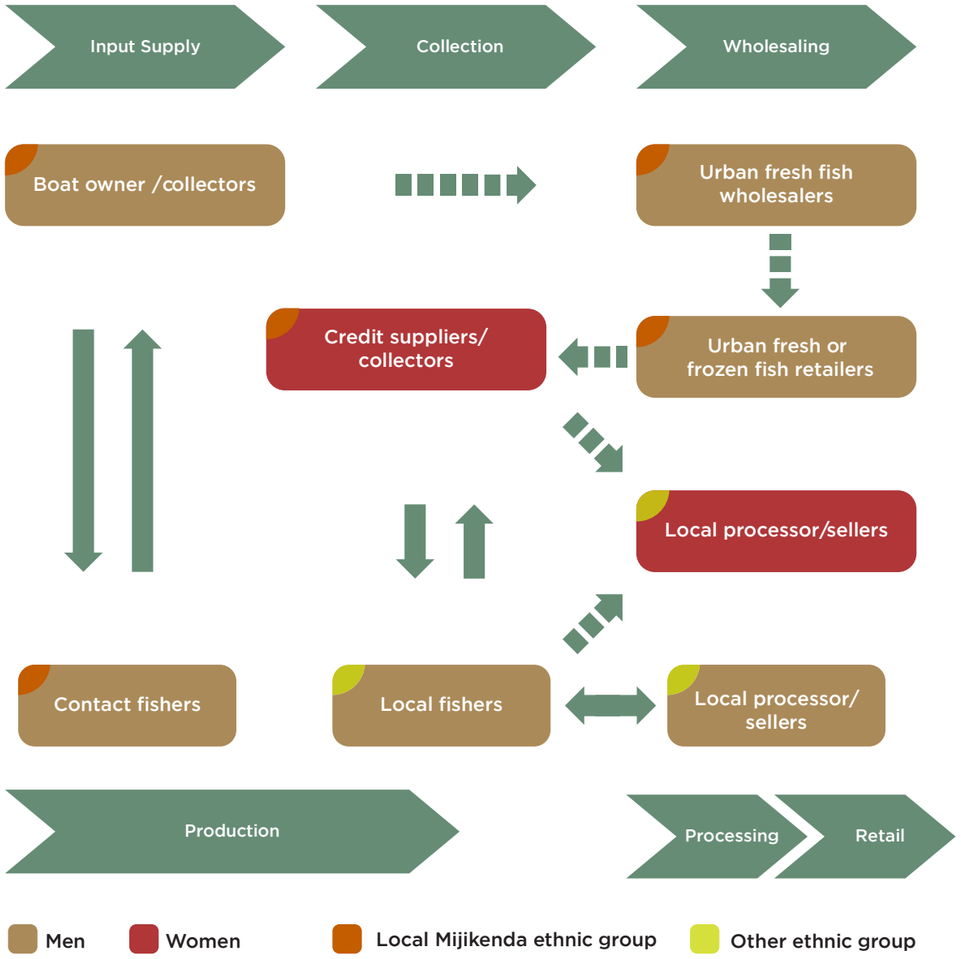



Figure 8. A gender-sensitive mapping of relationships and linkages – the case of coastal fisheries in Kilifi, Kenya. Source: Adapted from[4]

4. N. Kawarazuka, *Gender relations, family dynamics and gendered approaches to food security among the Mijikenda of coastal Kenya,* Ph.D Thesis. UK, University of East Anglia, 2015.



In the example above, female credit suppliers play a significant role in sustaining local small-scale fisheries, in which their persistent relationships with fishers are central. Fishers' incomes are unstable and uncertain. Sometimes local fishers lack credit for inputs (maintaining fishing nets, fuels), as well as money for everyday meals for their families. To overcome their uncertainty, local fishers build strong mutual support relationships with female collectors, including some who also provide credit. Fishers borrow money from them in times of need, and in turn, the fishers sell their catches to the same female credit suppliers/collectors. When fish catches are low, the female credit suppliers/collectors purchase frozen fish from urban retailers (spot market relations) and therefore enjoy more stable incomes than local fishers. Local fishers have mutual support relationships with local female processors/sellers but not with local male processors/sellers (see red circles in Figure 8). Careful research and analysis are therefore needed to understand the meanings of gendered persistent relationships for poor fishers.

## Step 7
## Map the number of actors and employment generation in each process

Estimating the number of different actors and employment along the value chain provides important information about the potential scale of impact on target groups. The number of poor, women and men, or other target groups involved in the different process steps is a dimension that can be included in this analysis and the **Value Chain Table as shown in table 5.**

Getting detailed estimates of absolute and relative numbers of actor groups and employment will require input from key informants, local statistics, and other secondary data. However, even indicative best-estimates can provide valuable information at the early stages of research where time and resources might be limited. More detailed information can be gathered using the methods outlined in Tool 7.

When using a gender and social inclusion lens to look at actors and employment generation, it is important to gather gender-disaggregated data on the number of actors and employees, and to consider carefully where disadvantaged social groups are concentrated.

**Table 5 next page**

**Table 5. Value Chain Table, showing processes, actors and activities and number of actors**

| Process Step | Production | Collection | Processing | Wholesaling | Retailing |
|---|---|---|---|---|---|
| Actors | Male farmers<br>Female farmers | Small scale<br>Medium scale<br>Large scale | Household processing<br>Commercial processing | Wholesalers | Traditional retailers<br>Modern retailers |
| Activities | Male farmer Activities:<br>Female farmer Activities: | Small-scale collector activities:<br>Medium-scale collector activities:<br>Large-scale collector activities: | Household processing activities:<br>Commercial processing activities: | Wholesaling activities: | Traditional retailer activities:<br>Modern retailer activities: |
| Number of Actors and Employment | 250 male farmers<br>300 female farmers | 12 small-scale collectors (eight female and four male)<br>20 medium-scale collectors (10 female and 10 male)<br>Four large-scale collectors (one female and three male) | 30 household processors (28 female and two male)<br>Two commercial processors (20 employees) (15 female and two male) | Two wholesalers (30 employees) (eight female and 22 male | 400 traditional retailers<br>Eight modern retailers (80 employees) (40 female and 40 male) |



## Step 8
## Map external influences and indirect actors

Value chains are influenced by numerous external factors and indirect actors which should be mapped and understood. These factors and actors influence the specific opportunities, constraints, and likely success of different value chain development options.

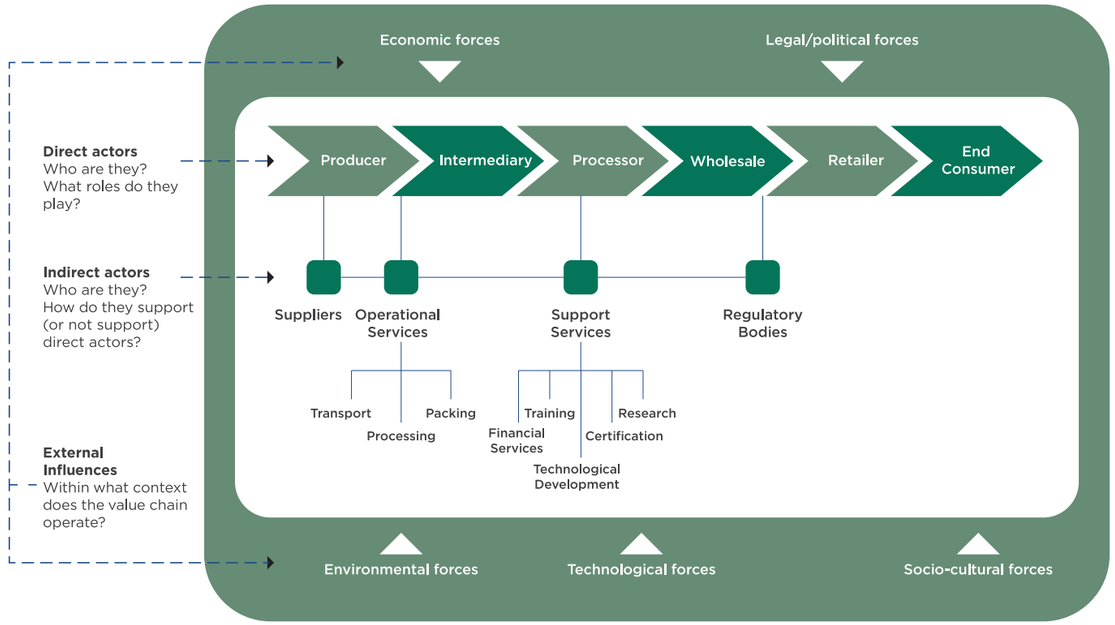



Figure 9. Direct actors, indirect actors, and external influences on the value chain. Source[5]

**External influences** include the economic forces, social-cultural context, business-enabling environment, legal and political forces, technological forces, and environmental forces that affect the structure, conduct, and performance of the value chain. External influences include the operation of the wider market system, its supporting functions, and rules and regulations.

Mapping external influences addresses key questions about the context the value chain operates in.

**Indirect actors** include input suppliers, operational service providers (e.g. transporters, pickers, and packing service providers), support service providers (e.g. financial services, business services, certification, extension, and research), industry organisations, and regulatory bodies.

5. M. Lundy et al., *LINK methodology: a participatory guide to business models that link smallholders to markets, version 2.0. Cali,* International Center for Tropical Agriculture (CIAT), 2012.

## Step 8
## Map external influences and indirect actors
(Continued)

Mapping indirect actors addresses the following key questions: Who are the indirect actors? What is their role and influence on the chain? How do they support (or not) the direct actors?

With a gender and social inclusion lens, mapping indirect actors and the services they provide should take the following key questions into account:

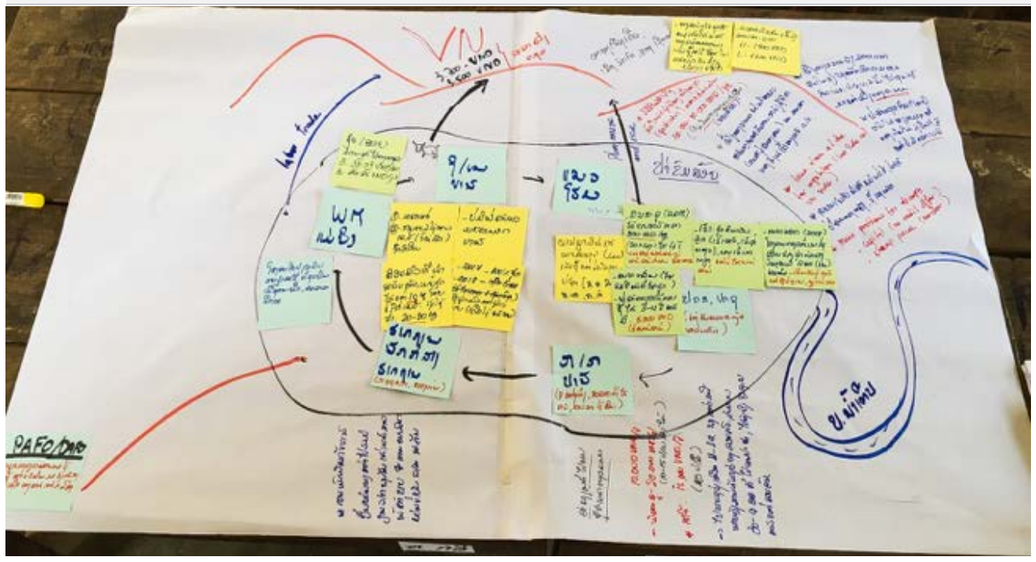
1. **Local and national policies:** Are there any gender and social inclusion policies through which disadvantaged groups and women can be supported?
2. **Research into new varieties, agro-chemicals, machinery and practices:** To what extent are women's and men's different needs and interests taken into consideration in research strategies and activities?
3. **Extension services:** Are there gender-based constraints for women to access current extension information and services (language barriers, time constraints, limited physical mobility to reach the venue)?
4. **National and local regulations:** Can disadvantaged social groups comply with national and local regulations? What are their constraints? Are there any possibilities that new regulations can harm or exclude specific actors of one gender group or of disadvantaged social groups?
5. **Standards:** Are there any possibilities that new regulations can harm or exclude specific actors of one gender group or of disadvantaged social groups?
6. **Financial services:** Do very poor households have access to financial services? How about female-headed households? What about ethnic minority groups?

Information about external influences and indirect actors can be gathered through participatory methods, such as Participatory Institutional Mapping. Instructions and an example of institutional mapping in the maize value chain in a village in Lao PDR are presented in Box 1.



**Box 1: Participatory Institutional Mapping**

- Using a large, poster-size paper, draw a large circle to represent the village.
- Everything inside the circle is a committee or person in the village; all markers placed outside represent external organisations or individuals who have an impact on farming and the villagers' use of resources.
- Ask the group to think about:
  - All the organisations, committees, groups, and societies in the village, and
  - Individual villagers who play a particular role in the community.
- List each one on a piece of paper (a circle, perhaps) and glue them to the inside of the circle that's representing the village.
- Ask the group to think about:
  - Organisations and individuals outside the village who have some impact on farming and resource use (e.g., government officials, development workers, commercial firms, etc.)
- Place a shape for each individual (triangle) or group (circle) on the diagram, outside the circle that represents the village.
- Once the diagram is complete, find out who makes what decisions, how decisions are made, how leaders gain their authority, how conflicts are resolved, etc.



## Step 8
## Map external influences and indirect actors
(Continued)

The types of external influences and indirect actors that impact the value chain can be added to the Value Chain Table as shown in Table 6

**Table 6. Value Chain Table, including processes, actors, activities, indirect actors/ service providers, and external influences.**

| Process | Production | Collection | Processing | Wholesaling | Retailing |
|---|---|---|---|---|---|
| Direct Actors | Male farmers<br>Female farmers | Small-scale<br>Medium-scale<br>Large-scale | Household processing<br>Commercial processing | Wholesalers | Traditional retailers<br>Modern retailers |
| Activities | Male farmer Activities:<br>Female farmer Activities: | Small-scale collector activities:<br>Medium-scale collector activities:<br>Large-scale collector activities: | Household processing activities:<br>Commercial processing activities: | Wholesaling activities: | Traditional retailer activities:<br>Modern retailer activities: |
| Indirect actors / service providers | Agricultural extension<br>Credit providers | Mechanical services<br>Credit providers | Mechanical services<br>Credit providers | Mechanical services<br>Credit providers | Packaging design |
| External Influences | Government policy supporting agriculture<br>Climate change<br>Urbanisation | Electricity prices<br>Fuel prices | Electricity Price | Electricity prices<br>Fuel prices | Urbanisation<br>Competition from international retailers |



## Step 9
## Map knowledge and information flows

The information and knowledge possessed and needed by different actors, and the flow of information between direct and indirect actors, greatly influences the form and function of value chains. It is also likely the poor, women, or other target groups may not possess, or have ready access to, key knowledge and information. These factors will significantly influence the likely design and success of value chain interventions.

In contrast to physical products, information and knowledge are more difficult to capture in a visual diagram. Information and knowledge can:

1. Flow between actors within a single process step (for example, between farmers);
2. Exhibit a two-way flow pattern between actors at different process levels in the value chain (for example, a trader tells a farmer about product standards and quality requirements; a farmer gives the trader information about product availability and traceability); or
3. Flow between indirect actors/service providers and direct actors within the value chain (for example, extension agencies sharing information with farmers, and farmers sharing local knowledge around production processes with extension agencies).

This analysis requires knowing whether different actors or groups such as the poor or women possess the necessary information and knowledge to carry out processes and activities effectively and efficiently. Understanding the challenges these groups experience getting access to knowledge and information is also important.

A gendered analysis of information flows is shown in Box 2. This analysis highlights that female mango farmers in the Mekong River Delta have less access to updated knowledge and information than their male counterparts.

**Box 2: Next page**

**Box 2: Female farmers access to knowledge and information**

In a mango value chain project in Mekong Delta in Vietnam, a rapid gender analysis for mango producers was conducted to identify gender-based opportunities and constraints for developing more inclusive mango value-chain processes. The study found that, in general, men are more likely to have access to all types of resources. Men are members of the local cooperative where they learn new techniques and are updated with production information more often than women. They are also proactive in looking for information on the internet; women, meanwhile, did not report similar behaviour.

Women did not mention anything about learning new techniques, but they are acknowledged by men for their production knowledge. Male farmers in Dong Thap affirmed that although women do not work directly, they have a lot of knowledge. The results of the female group discussion showed that women actually participated in almost every step of the production process, and some of them did it very well. The results also showed that in Tien Giang, a woman ran the biggest and most productive mango farm.

In addition to mango production, women are responsible for most of the housework. The burden of housework limits their time availability to attend training or group meetings, which explains why it is men who participate in these activities more often. This is a barrier for women when they are the ones who participate in all steps of the production but their technical skills cannot be updated regularly. Although men said that they often share information with their wives, it is not enough and not as effective as when they can learn on their own in the training.

Source[6]

Information about external influences and indirect actors can be gathered through participatory methods, such as Participatory Information and Knowledge Mapping.

Instructions and an example of a simple approach to graphically map the information flow between various pepper value chain stakeholders in Vietnam are given in Box 3.

6. CARE International, *Rapid Gender analysis in under the Mango project,* (ACIAR AGB/2012/061), 2019, https://genderinagr.files.wordpress.com/2019/01/sra-gender-analysis-in-mango-project.pdf



**Box 3: Participatory information and knowledge mapping exercise**

Various dimensions such as the closeness of the relationship between actors, the importance to the business, the direction and volume of information flow, and the type of information, can be captured diagrammatically during interviews with value chain actors or other relevant stakeholders.

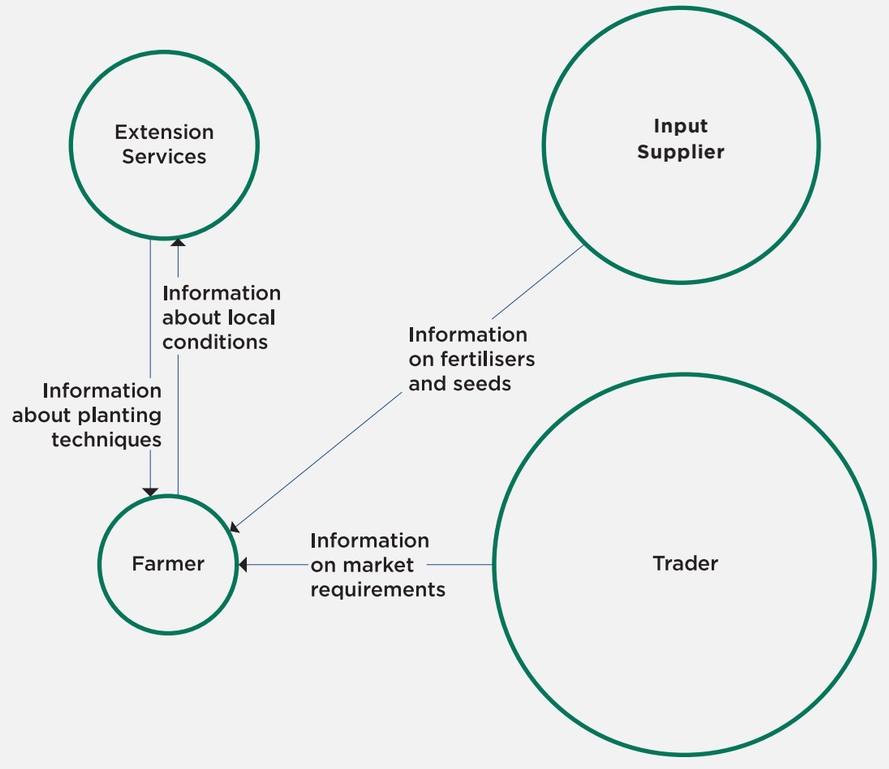
In this example, a simple three-step approach was used, and can be adapted to capture a range of useful dimensions:

**Step 1** Place each actor (stakeholder) according to the closeness of the relationship (proximity) and importance to the business (size of the circle).

**Step 2** Draw arrows to show the flow of information, the thickness representing volume.

**Step 3** Describe the type of information for each arrow.

The type of diagram obtained is shown below:



## Step 9
## Map knowledge and information flows
**(Continued)**

Mapping information in the Value Chain Map involves showing the flow of information between direct and indirect actors at each process in the value chain, as shown in Figure 10.

Critical knowledge and information needs and flows for different actors, processes and activities can be presented in the Value Chain Map. More detailed tools to help to track down what kind of knowledge or information flows exist in a value chain can be found in Tool 2.

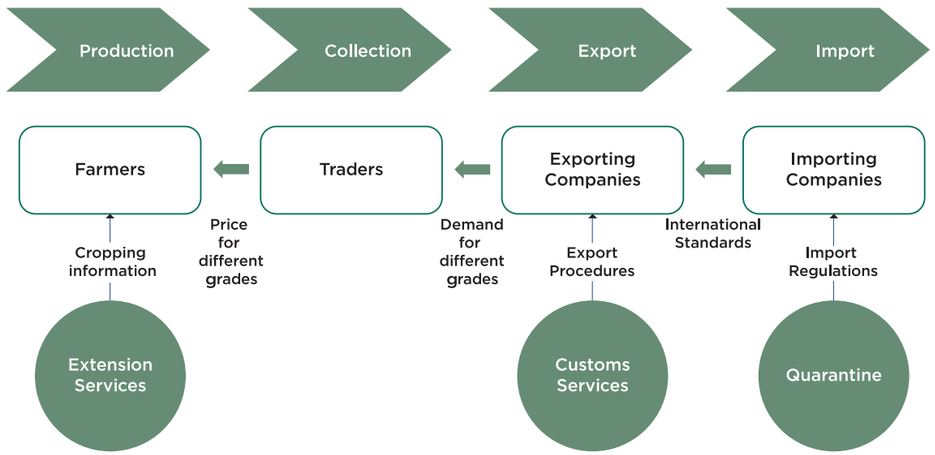



Figure 10. Incorporating information flows into the Value Chain Map

## Step 10
## Map constraints and potential solutions

Constraints exist at almost all process levels of any value chain. For example, there could be constraints to greater efficiency, constraints to accessing markets, constraints to upgrading, or constraints to greater involvement of poor or disadvantaged women and men.

Identifying constraints, and potential solutions, should be undertaken at all process levels. The analysis should go beyond technical and physical constraints and benefits. Often there are major social, cultural, and economic reasons why the poor, women, or other target groups may not adopt or benefit from value chain interventions or changes. A careful assessment of the underlying reasons behind the problems and constraints identified and possible solutions (or areas for intervention) needs to be undertaken at a later stage. Whilst potential solutions or intervention areas could be proposed, it will require deeper analyses using the other value chain tools described in this toolbook to provide stronger evidence of which options to pursue.



Guiding questions for gender and social inclusion enquire about who is affected by constraints and solutions:

- What constraints are specific to the targeted social groups?
- Are the proposed solutions relevant to the disadvantaged social groups?
- Are the proposed solutions relevant to women?
- Do the target social groups possess the necessary assets (physical, natural, financial, human, and social) to adopt or benefit from the proposed solutions?
- Which social groups will benefit the most from the proposed solutions?

Figure 11 below is an example of a pork value chain. Small-scale women farmers from ethnic minority groups are the target group (see the red circle in the figure).

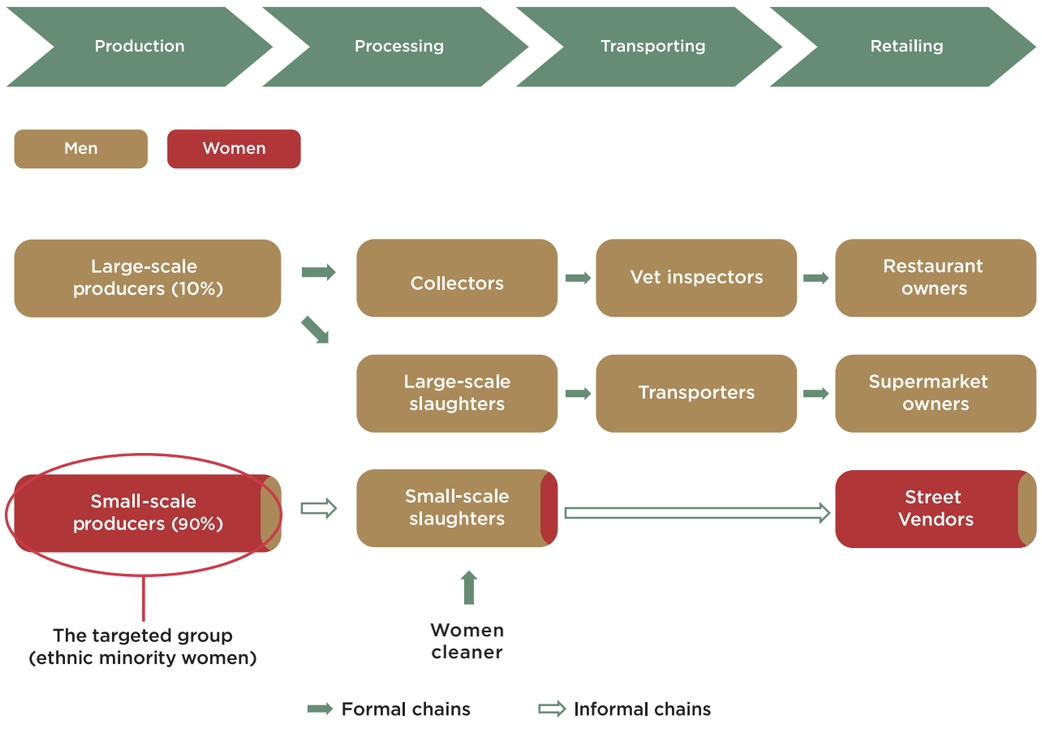



Figure 11. Incorporating targeted social groups into the Value Chain Map

## Step 10
## Map constraints and potential solutions
(Continued)

The ethnic minority women were found to face some gender- and ethnicity-based constraints to improve both the quality and quantity of indigenous pigs (Table 7).

**Table 7. Example constraints and proposed solutions with a gender lens**

| Technical issues | Gender- and ethnicity-based constraints | Possible proposed solutions (fiction) | Relevance to women empowerment |
|---|---|---|---|
| Lack of clean water for pigs | Women are overburdened with agriculture and domestic work. No additional time and labour available to carry clean water for pigs every day. | Establishing a small water facility near the pig shed | Saving women's labour and time |
| Proper treatment for diseases to prevent epidemic | Women have limited opportunities to attend training due to limited physical mobility, language barriers, and domestic chores. | Training of trainers targeted to female ethnic minorities | Leadership trainings for ethnic minority women |
| Lack of capital to invest in piglets, high quality feeding, and facilities | Women are aware of the importance of investing in pig production, but cannot get support from their husbands (household decision-makers) | Training for men to understand the importance of investing in pig production, which, in turn, can benefit their families. | Women have more autonomy in the household |

## Step 11
## Produce a geographic map

The value chain process stages and product flows can be represented spatially on a geographic map of the study area. This map could be at provincial, national, regional or even global scales. It is also important to understand and represent the geographic distribution of target groups on the map.

In addition to specific target groups, value chain studies often have a defined geographic scope or regional focus aligned to government and donor priorities. This may comprise specific districts, regions or countries. Studies may also have a pre-determined commodity focus,



for example maize and cassava value chains in mountainous areas. When creating a geographic map, it is important to remember that many agri-food products and value chains, (e.g. coffee, cassava and cocoa), are traded and operate across borders at national, regional and global scales.

Figure 12. Geographic mapping of core value chain process locations and actor types in the cassava value chain Source: Mapping Exercise for Cassava Value Chain, Vientiane, Laos, 2016[7]

7. V. Manivong et al., 'Value Chain Analysis, Household Survey and Agronomic Trial Results - Lao PDR', *Discussion Paper, no. 5,* July 2018.

## Try This

Use a projector to project an image of a geographic map onto an A0 sheet and trace around the key geographic features using different colored markers to create an accurate base for the geographic map.

# What Should be Known after Analysis is Complete

This tool has given an overview of the different dimensions that can be mapped and offered suggestions on how to produce a **Value Chain Map, Value Chain Tables, and a Geographic Map.**

This initial mapping exercise provides a sound basis for undertaking the full value chain analysis described in the following tools. In particular, after the mapping exercise is complete, practitioners should be able to determine which value chain actors should be interviewed, what information should be gathered, what significant information gaps exist, and the geographic locations where fieldwork should be conducted.

The next chapters provide tools to help analyse these dimensions in more detail.

Roadside stalls are an important part of the fruit value chain in Cambodia.
Photo: ©2009CIAT/NeilPalmer

# Tool 3
# Governance

# Introduction

The analysis of governance aims to investigate the system of coordination, regulation and control, and the rules operating in a value chain.

Governance refers to both the legally defined rules and regulations that influence the chain, as well as the commercial norms and imperatives of competition that influence how production is structured. Governance implies that interactions between actors in the value chain are frequently organised in a way that allows competitive firms to meet specific requirements in terms of products, processes, and logistics in serving their markets. As such, it recognises that power is not evenly distributed. It also acknowledges that access to market opportunities for poor women and men, particularly those from disadvantaged groups, requires understanding about how production systems are organised to meet these competitive requirements.

Because "governance" looks and sounds like "government", the term is often interpreted narrowly to include only the legal and regulatory requirements that influence business operation and market access in a value chain. In fact, the instruments of governance range from contracts between value chain participants to public regulatory frameworks, to broader unwritten "norms" that determine who can participate in a market, including gender norms.

Coordination, regulation, and control processes can operate and influence at difference scales throughout the value chain, from the micro-scale (farm and enterprise level), to meso-scales (at district and regional scales), to macro-scales (national and global levels).

Chinese import regulations and buyer requirements influence how mangos are grown, packed, and exported from Dong Thap province in southern Vietnam.
Photo: FocusGroupGo/Rodd Dyer



Governance requirements may be "official" or "unofficial" and may originate within or outside of the value chain. These may be as simple as the requirement imposed by wholesalers that agricultural products be correctly harvested to prevent damage and degradation. Conversely, they may be as complex as a foreign government's enforcement of international standards regarding permissible levels of pesticide residues and health protocols on imported products. Another example is the procedures imposed by a multinational firm as a condition for participation by a subcontractor in its global supply chain. There are numerous possible governance influences between these extreme examples, and value chain analysts should work to clearly understand what factors influence the organisation of production, and the position of farmers and other producers in these arrangements.

Regardless of the level at which rules originate, value chain participants can find opportunities for upgrading and participation in higher-value markets where they have the resources to learn about the requirements to participate in these markets. Value chain actors may also have limited access to specific services and other forms of support required for meeting value chain standards. Insufficient support can hamper their ability to actively participate in higher-value segments of the chain. Access to information about commercial requirements, standards, and compliance-related services that may be delivered through government, semi-public initiatives, or through the private systems of value chain coordination, are key concerns in analysing upgrading opportunities for poor or socially disadvantaged producers.


Developing certified safe vegetable value chains has enabled smallholder farmers in Moc Chau district of northern Vietnam to supply supermarkets in Hanoi, and significantly improve their incomes.
Photo: Vu Thi Phuong Thanh

# Objectives

The main objectives of governance analysis are to:

- Understand how the value chain is coordinated, including key firms (actors) and mechanisms (i.e. contracts, agreements, services), and why this coordination structure has arisen and evolved;
- Map the formal and informal rules, regulations, and standards that influence the value chain, how compliance to the rules is monitored, and what sanctions and incentives are used to ensure compliance;
- Assess the impact of the rules regulations and standards on actors, particularly on women and men, and disadvantaged groups such as marginal farmers and ethnic minorities; and
- Assess how different groups receive (or lack access to) adequate forms of support that can help them achieve the required standards.

# Steps

Analysing governance relies mostly on qualitative information that is best collected using open-format and semi-structured interviews with value chain participants and other key informants. It is difficult to capture the required information using a fixed-format questionnaire. Useful information should also be sourced from desk research.

## Step 1
## Map direct and indirect actors

A first step is to list all direct and indirect actors (inside and outside the chain) **likely to influence the governance structure** in different market channels, including important external organisations and institutions. The Value Chain Mapping Tool (Tool 2) can be used to identify all the relevant actors and institutions in the chain.

Important actor subgroups should be defined based on wealth (poor, average, better off); business type and scale (micro, small, medium, large); ethnicity (different ethnic groups); and gender (women and men). It is important to understand the impact of the governance structure on different groups and to assess the level of information asymmetries along the chain, etc. Be aware that women are often hidden in informal chains or may play supportive roles that should be understood. This categorisation has been described in the Value Chain Mapping Tool (Tool 2).



## Step 2
## Determine the dominant coordination arrangements

Every value chain has a system of coordination which includes formal and informal arrangements between participants. Figure 1 illustrates five global value chain types along the dual dimensions of explicit coordination and power asymmetry. Coordination structures may range from loosely coordinated trading structures (e.g. Market), to highly coordinated, vertically integrated production (e.g. Hierarchical). The small line arrows represent exchange based on price, while the larger block arrows represent thicker flows of information and control, regulated through explicit coordination. Each of these value chain types have different fundamental characteristics in relation to the complexity of transactions, ability to codify transactions, and capabilities in the supply base.

Coordination structures are constantly evolving to enable firms to be more competitive in intermediate and final markets, to ensure compliance with official or unofficial rules and standards, and to make better use of capital investments.

There may also be more than one system of coordination operating in a single value chain in any given area; for example, where independent and contracted producers exist side-by-side.

It is also worth noting that strengthening coordination and cooperation in a horizontal dimension, amongst the same actors (e.g. through networks, marketing groups, alliances and cooperatives), is often required to develop more functional and inclusive value chain partnerships[1].

The presence and role of lead firms (See Box 1) often influences value chain coordination due to their configuration of production systems and enforcement of rules for selling their products into intermediate or final markets.

Even within a single industry, lead firms may move towards more explicit forms of vertical coordination and influence, as rules determining access to certain customers and market segments become more complex and restrictive. These firms may be ultimately accountable to governments and consumers for the compliance of their goods with official or unofficial requirements. As the requirements to comply with strict product delivery, quality, safety, and integrity standards increase, lead firms may exert increased direct and indirect influence over production and transportation of goods.

The adoption of rules and standards by lead firms (and their agents) will therefore influence which producers can participate in their supply systems. This may create barriers or opportunities for the participation of the poor in these value chains, depending on the conditions under these requirements can be met.

1. Moustier, P., Tam, P.T.G., Anh, D.T., Binh, V.T. and Loc, N.T.T., 'The role of farmer organizations in supplying supermarkets with quality food in Vietnam'. *Food Policy*, vol. 35, no. 1, 2010, pp. 69-78.

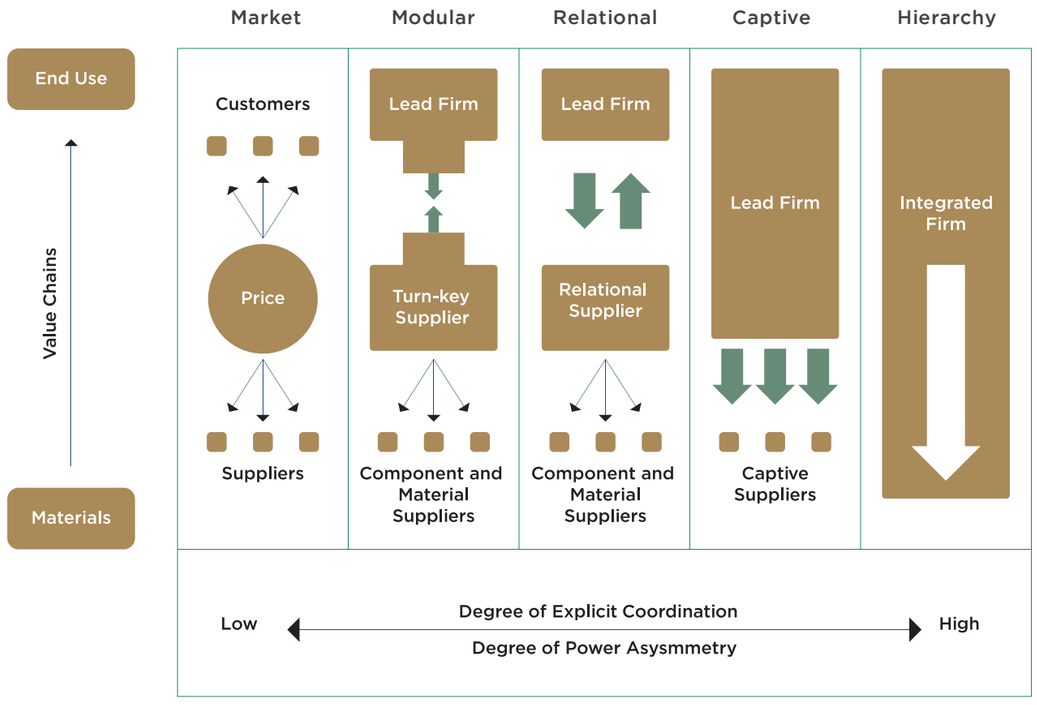



Figure 1. Global value chain classification. The different types of global value chains are ranked according to the degree of power asymmetry and explicit coordination. Source[2]


Private quality and food safety standards influence access to modern supermarkets in Indonesia.
Photo: Oikoi



**Box 1: The rationale for targeting lead firms in value chain development**

**Lead firms** can be defined as influential small, medium, and large firms that have forward (downstream) or backward (upstream) commercial production linkages with specific micro-, small-, and medium-scale enterprises (MSMEs) in the value chain. Lead firms increasingly have more influence in setting rules and standards in value chains.

Working with lead firms can promote greater integration of MSMEs into value chains and provide important goods and services. By promoting relationships between these firms and targeted MSMEs, projects can promote industry competitiveness, achieve leveraged and sustainable impact for targeted MSMEs.

Source[3]

## Step 3
## Identify rules, regulations, and standards

There are normally rules, regulations, and standards that value chain actors must abide by in order to participate in the chain. It is also important to distinguish between compliance with regulatory requirements and adherence to private voluntary standards. These can be viewed as a mechanism that enables firms to respond to consumer demands and meet regulatory requirements. But if communicated to consumers, private standards can also be used as part of product differentiation and market segmentation strategies[4].

This step aims to:
- Develop a clear understanding of the rules, regulations, and standards that influence chain actors in end-markets;
- Identify the actors that set the rules regulations and standards; and
- Assess how the rules regulations and standards affect different categories of actors.

### Rules and regulations

Rules and regulations can be either **formal** (with official legislative backing) or **informal** (determined by commercial norms). Private voluntary standards that provide products with specific designations, such as organic or fair-trade, exist somewhere in-between. At the same time, both actors **within** and **outside** the value chain can set rules.

The main rules in local markets, particularly where official standards are weak or poorly enforced, tend to be locally-set commercial norms related to product quality, grading, and business practices.

2. Gereffi, G., J. Humphrey, et al., *The Governance of Global Value Chains: An Analytical Framework,* 2003.
3. Working Paper – *Cycle 1: Defining Lead Firms and Principles of Facilitation*, FIELD Facilitation Working Group, 2008, http://www.actionforenterprise.org/field1.pdf
4. L. Fulponi, The Globalization of Private Standards and the Agri-food System. *In Global Supply Chains, Standards and the Poor* (ed.) J.F.M Swinnen. 2007, pp. 5- 18, https://www.researchgate.net/publication/240638074_Global_Supply_Chains_Standards_and_the_Poor

## Rules and regulations

(Continued)

In these loosely coordinated systems, wholesalers or traders may enforce rules upon producers through differential pricing, providing limited information or assistance with compliance. Rules may not be communicated or may vary between regions within a national market. Poor producers also may not understand rules related to product quality or other commercial requirements and therefore may engage in antagonistic relations with buyers, which can aggravate other value chain dysfunctions.

Understanding and complying with local commercial rules is generally a pre-condition for value chain upgrading. It might also be a stepping-stone to export strategies, since producers are unlikely to be able to comply with complicated standards if they are unable to understand, accept, and comply with the basic requirements of local markets.

In the past, rules were largely concerned with meeting basic cost parameters and guaranteeing supply; they usually involved agreement between buyers and suppliers within the chain. As agri-food value chains have modernised and globalised, there has been a proliferation of standards, rules, protocols, quality assurance, and certification systems governing food products[5]. This has mainly been in response to changing urban consumer demands and government regulatory requirements. In order to access certain market segments, suppliers increasingly need to meet official and commercial rules and regulations for product attributes such as food safety, biosecurity, integrity, traceability, origin, and provenance. Assurance of environmental, ethical, and animal welfare credentials of the inputs, production system and value chain itself is also increasingly required.

The standards, regulations, and protocols faced by producers participating in export markets are vastly more complex than those governing local and national markets. Official and commercial standards usually apply in both cases. Compliance with standards, rules, and regulations set within these global value chains throughout large and diffuse smallholder-based value chains is complex and costly. The need to comply with multiple and overlapping international product standards and regulations can be a major barrier for smallholder farmers to participate in export-oriented value chains.

Lead firms too, need to find more cost-efficient and effective ways to meet consumer product preferences and regulatory requirements in order to access and compete in higher value markets. These changes, combined with the application of new digital technologies and the internet-of-things (IoT), are driving innovation and change

5. S. Henson and T. Reardon, 2005, 'Private agri-food standards: implications for food system policy and the agri-food system', *Food Policy*, vol. 30, 2005, pp. 241-253.



in production and post-harvest systems, value chain coordination and business organisation models, traceability, integrity, and quality assurance systems. A major challenge for lead firms and value chain researchers is to identify technologies, innovations, and solutions that are also inclusive of smallholder producers and micro and small enterprises.

## Standards

Standards in agricultural value chains can be of three main types: (i) commercial standards and grades – these are frequently internationally accepted basic standards related to aspects or key intrinsic characteristics of the product; (ii) national and international public standards – these include phytosanitary standards and minimum chemical residue levels (MRLs); and (iii) national and international private standards.

### 1. Commercial standards and grades

Commercial standards and grades generally are internationally accepted norms relating to qualities of the product – this could include size, shape, colour, moisture content, etc. For example, the grading scale of the Specialty Coffee Association of America (SCAA) for green coffee beans shown in Box 2. The Indian grading chart for cashews based on nut size, colour, scorching, and pieces is shown in Figure 1.

**Box 2: Grading scale for 350g of green coffee beans**

**Grade 1:** Specialty Grade Coffee Beans: no primary defects, 0-3 full defects, sorted with a maximum of 5% above and 5% below specified screen size or range of screen size, and exhibiting a distinct attribute in one or more of the following areas: taste, acidity, body, or aroma. Also, must be free of cup faults and taints. Zero quakers allowed (unripened beans that are hard to identify during sorting). Moisture content between 9-13%.

**Grade 2:** Premium Grade Coffee Beans: Same as Grade 1 except maximum of 3 quakers. 0-8 full defects.

**Grade 3:** Exchange Grade Coffee Beans: 50% above screen 15 and less than 5% below screen 15. Max of 5 quakers. Must be free from faults. 9-23 full defects.

**Grade 4:** Standard Grade Coffee Beans: 24-86 full defects.

**Grade 5:** Off Grade Coffee Beans: More than 86 full defects.

Source: Specialty Coffee Association of America (SCAA)

Quality standards affect market access and prices for Robusta coffee farmers in Dak Lak province in central Vietnam.
Photo: ACIAR/Vietnam

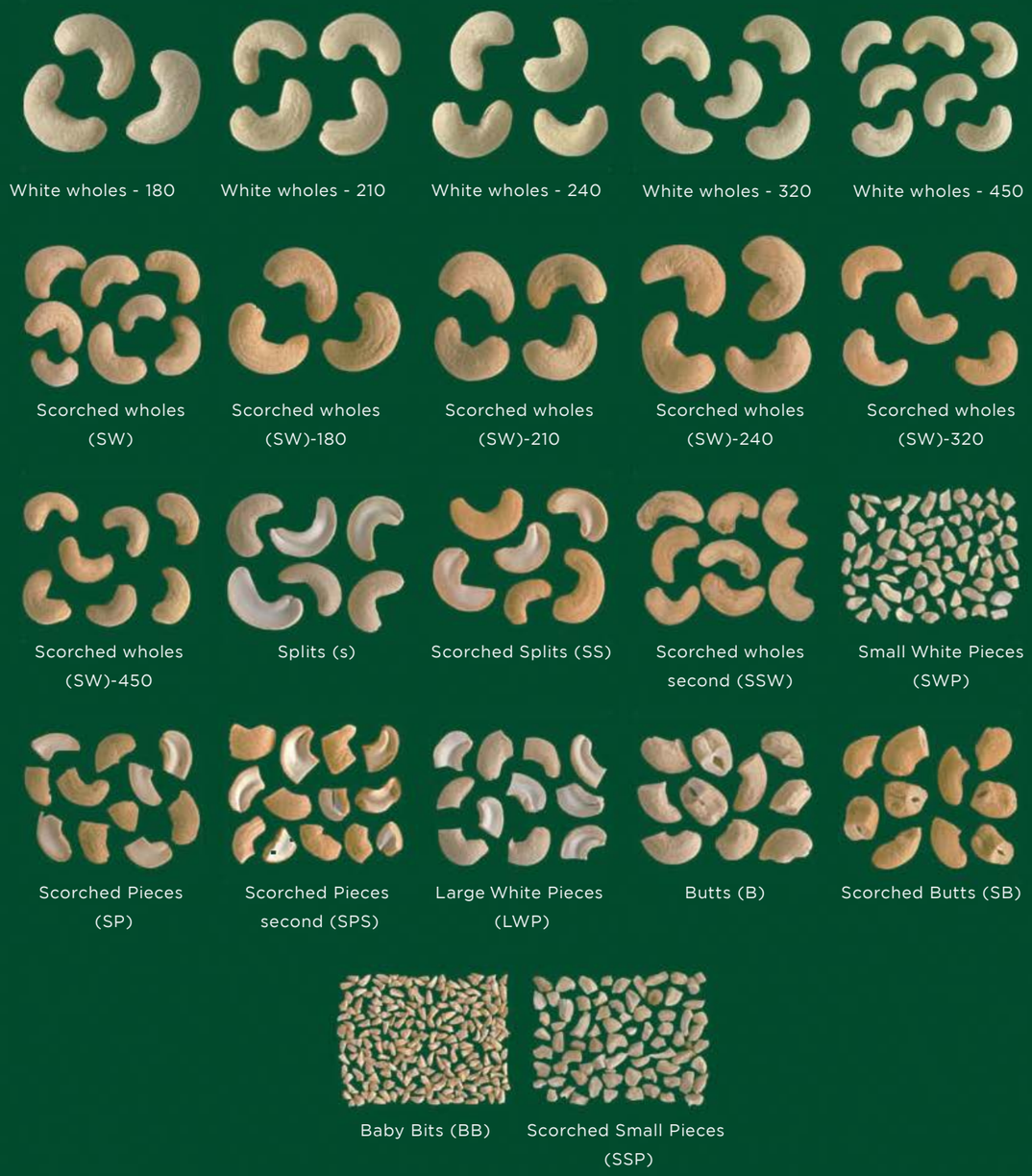



Figure 2. Indian Cashew Nut Grading Chart



## 2. National and international public standards

These standards are predominately sanitary and phytosanitary standards concerned with protecting public health and food safety. One of the main international standards is known as Codex (see Box 3).

**Box 3: The Codex Alimentarius Commission (Codex)**

**CODEX**

The Codex Alimentarius Commission (Codex) is the international food standards setting body established by the United Nation's Food (FAO) and Agriculture Organization and the World Health Organization (WHO). Codex develops international food standards, guidelines and codes of practice for an international food code that contributes to the safety, quality, and fairness of food trade.

The Codex Alimentarius is a collection of internationally adopted food standards and related texts presented in a uniform manner. These food standards and related texts aim at protecting consumers' health and ensuring fair practices in the food trade. The publication of the Codex Alimentarius is intended to guide and promote the elaboration and establishment of definitions and requirements for foods to assist in their harmonisation and in doing so to facilitate international trade.

The Codex Alimentarius includes standards for all the principal foods, whether processed, semi-processed, or raw, for distribution to the consumer. Materials for further processing into foods should be included to the extent necessary to achieve the purposes of the Codex Alimentarius, as defined. The Codex Alimentarius includes provisions regarding food hygiene, food additives, residues of pesticides and veterinary drugs, contaminants, labelling and presentation, methods of analysis and sampling, and import and export inspection and certification.

Codex standards and related texts are not a substitute for, or alternative to, national legislation. Every country's laws and administrative procedures contain provisions with which it is essential to comply.

Codex standards and related texts contain requirements for food aimed at ensuring for the consumer a safe, wholesome food product free from adulteration, correctly labelled and presented. A Codex standard for any food or foods should be drawn up in accordance with the Format for Codex Commodity Standards and contain, as appropriate, the sections listed therein.

Source[6]

6. FAO, *Codex Alimentarius International Food Standards*, Food and Agriculture Organization of the United Nations (FAO) and World Health Organization (WHO), http://www.fao.org/fao-who-codexalimentarius/about-codex/en/

## 3. National and international private standards (Continued)

Over the past 15 years, driven by increasingly buyer-driven chains, private safety and quality standards have flourished in many market channels. This is particularly the case with higher-value agricultural value chains, which now account for an increasing proportion of agricultural products exported from Asia and Latin America to developed country markets. Examples of private standards include GlobalGAP, Organic Standards, Fairtrade (FLO) standards, Rainforest Alliance/Utz, and 4C Coffee Certification.

Private standards are often more stringent than public ones[7] and in many cases have a broader scope than public standards – for example, covering social and economic and environmental sustainability aspects as well as product characteristics and food safety. Private standards may be second party conformity assessed (usually by the buyer of the product) or third-party conformity assessed (assessed by an independent agency[8]).

In many cases, private standards must be applied at different processes along the value chain in order to maintain the integrity of the standard. This means that it is not possible to apply part of the standard unilaterally at one process level of the value chain – for example, organic certification requires actions and controls at each step.

Sub-steps for identifying rules, regulations, and standards that apply to a value chain are presented below:

- Begin by interviewing key actors in the chain (e.g. lead or coordinating firms, major processors, wholesalers, or exporters) who are most likely to be aware of these issues. In traditional smallholder value chains, wholesalers or other key intermediaries may be the most important sources of information on de facto standards and rules, as informal commercial norms are more common in these contexts.
- Additional sources of information such as websites, statutes, and legal documents should also be consulted about the requirements of various rules and regulations.
- After the initial interviews, other actors can be interviewed following backward linkages in the chain.
- Information should be gathered using semi-structured interviews. The guiding questions in Box 4 can assist in collecting information from key informants.

7. T. Vandemoortele & K. Deconinck, 'When Are Private Standards More Stringent than Public Standards?', *American Journal of Agricultural Economics*, Agricultural and Applied Economics Association, vol. 96, no. 1, 2014, pp. 154-171.

8. Third Party Conformity Assessment is undertaken to the standard outlined in ISO/IEC 17065:2012 and the agencies undertaking the third-party assessment must themselves be certified to be able to provide the services in ISO/IEC 17065:2012.



**Box 4: Guiding questions for key informants**

- What rules, regulations, and standards (formal and informal) **do informants need to comply** with to operate in their market segment?
- What are the consequences or sanctions for non-compliance?
- How is information about product specifications, price, quality, processes, delivery times etc presented or communicated?
- What rules, regulations, and standards do informants **require their suppliers to follow?**

**Guiding questions relating to each rule and regulation**

- Which actors (or groups of actors) are affected by rules and arrangements such as contracts and informal agreements? How are the rules communicated in the form of instructions on, for example, quality specifications, costs, delivery time, inputs, equipment, and processes to be used for production?
- What are the main advantages and disadvantages of compliance?
- Why is the rule necessary, and how does it help maximise the efficiency and the level of coordination within the value chain?
- How and when have the rules been set? By whom? Have there been major changes in the rules over time, and have these changes affected business? How?
- What is the awareness and understanding of the rules by target groups such as the poor, ethnic minorities, and women? Are there written guidelines or contracts? Can groups understand the terms?
- Do actors get feedback on their actual compliance with the rules? Are there learning processes in place to ensure compliance? Are there penalties, sanctions, or incentives to encourage compliance?

**Advantages** might be expanded market access, reliable quality management systems, and more effective and efficient production plans. **Disadvantages** might include higher costs and decreased profit margins, demanding requirements in terms of processes, technology, and scale, and difficulties finding local suppliers or skilled workers that can comply with requirements.

After the interviews, there should be enough information to generate a diagram of key regulations, voluntary standards, and commercial rules that impact each value chain segment, and the enforcement, incentives, and sanctions associated with each rule (Figure 3).

Try This

**Comparing results across different categories of actors**

Important information can emerge from the comparison of tables, maps, and indicators grouped for different categories of actors (e.g. poor farmers, small-scale processors).

For example, try to compare and map the rules that emerge from each group of actors, as these will give you an idea of how different groups perceive the overall governance of the value chain. It is likely that strong information asymmetries will emerge from the comparison.

Figure 3 provides an example of how to organise information about the different standards that operate within market channels in a value chain. The figure represents a stylised cashew value chain with the requirements for various public and private standards at each process level of the value chain indicated.

Figure 3 next page



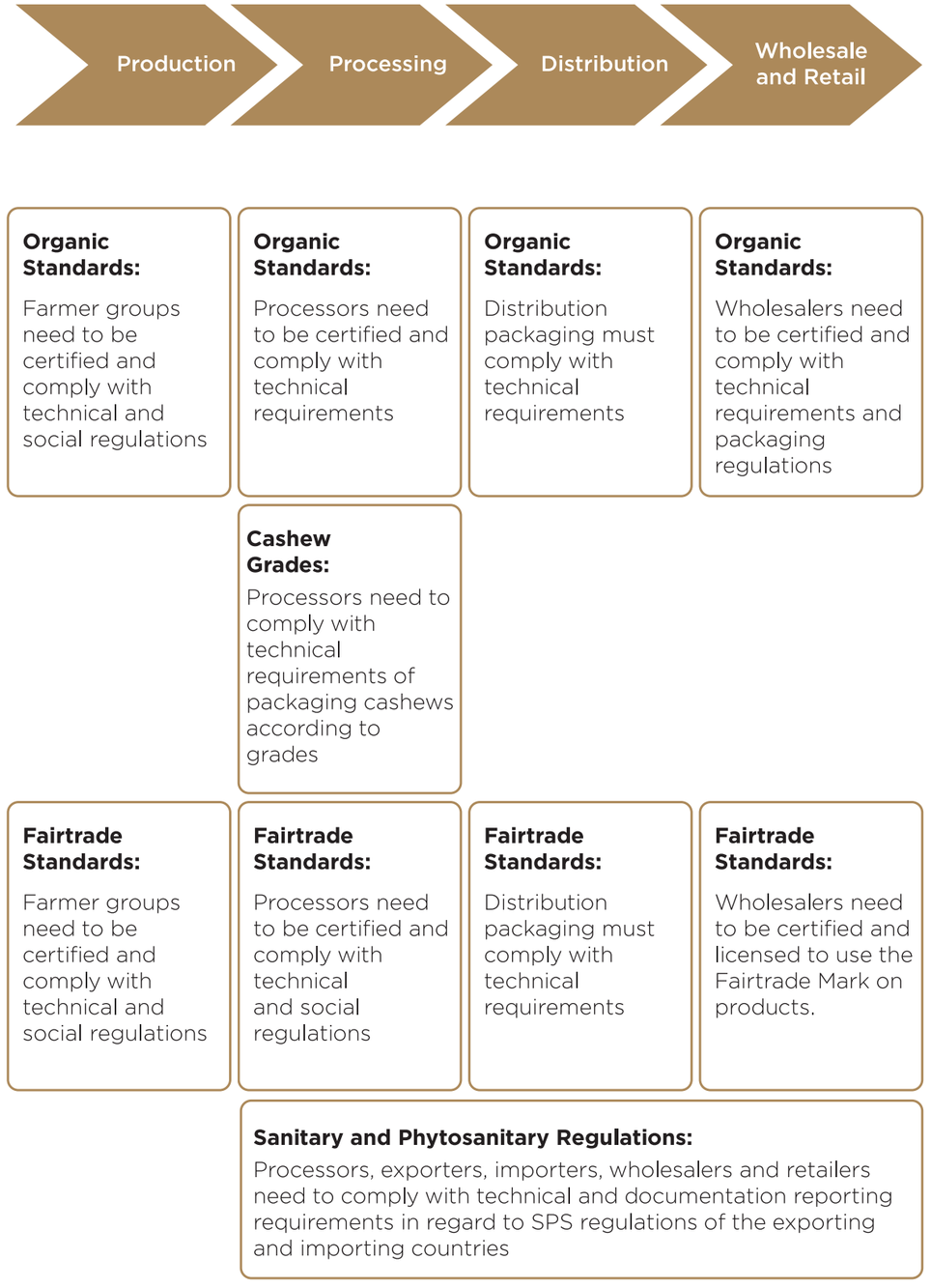



Figure 3. Example standards and regulations at different process steps of the cashew value chain

## Step 4
## Analyse the impact of rules and standards on value chain participants

This step aims to understand the impact of rules and standards on value chain participants, including:

- Who monitors compliance with the rules and standards?
- What sanctions or penalties are applied for non-compliance?
- What incentives are used to promote compliance with the rules and standards?
- How effective are the sanction and incentive systems?
- What are the relative cost-benefits of existing rules and standards; advantages or disadvantages?

Enforcement includes the procedures used to check compliance with the rules, and the system of rewards and sanctions used to promote observance of the rules. Without effective enforcement, rules may be set, but not kept. The first aspect of enforcement is monitoring at different stages of the chain. The second aspect is the sanctioning system; it can include both sanctions (aimed at punishing defectors) and incentives or rewards (to encourage observance of the rules).

Though government regulatory capacity may be important to enforcement, it is not always only a government function. Governments have increasingly become value chain actors themselves. Being accountable for ensuring food safety, for example, has meant governments have become key drivers in the development of private standards and modern value chains. Still, lead firms often have significant power to exclude non-performing producers from chains by revoking contracts or reducing prices.

It helps to produce a list of the actors involved in the enforcement system. Two separate sets of matrices can be generated: one of monitoring actors/monitoring procedures, another of sanctioning actors/sanctioning procedures. In the case of enforcement, it is particularly important to collect data regarding the frequency of inspections received by each actor from the different monitoring agents. Comparing maps and tables across different categories of actors (poor/non-poor, male/female, majority group/minority group, etc) shows how rules and standards impact differently on different groups.

**Box 5 next page**



**Box 5: The impacts of regulation changes on women and men street vendors in Hanoi, Vietnam**

In Hanoi, street vendors sell fresh vegetables, fruits, and flowers on streets. However, vending activities have been banned in some streets due to changes in urban policy and regulations. How do those changes influence women and men vendors? Let's look at it from a gender perspective.

Hanoi's informal food system is organised based on both social and economic interactions, and therefore the system's power hierarchy and gender relations are different from those of formal systems. Women operate based on social relations rather than economic interactions, while men's activities tend to be more capital-based and similar to more formal systems. As a result, men and women encounter different challenges in sustaining their activities in the face of policy and/or economic changes. For example, men's vending activities tend to be capital-based, and they rarely ask for support from peer vendors or family members.

Men's activities are vulnerable in the sense that they depend heavily on their own capital and labour, with little support, having limited buffers to cope with shocks. However, men may be more adaptable than women to the formalisation of the informal food sector, as their activities are already based on capital and, as such, closer to the formal trading systems.

Men are also adaptable to potential change in regulations such as the ban of vending activities on some streets, since many of them can move to other streets and engage in their activities at any location. Female vendors, on the other hand, may be more able to cope with economic shocks and recover from shocks quickly since they have support and connections through which they could restart their business without capital. However, they will have more difficulties adapting to changes in policies, as their business is operated and sustained by gendered social relationships.

Source[9]

9. N. Kawarazuka, C. Béné and G. Prain, 'Adapting to a new urbanizing environment: gendered strategies of Hanoi's street food vendors', *Environment & Urbanization*, vol. 30, no. 1, 2018, pp. 233-248.

## Step 5
## Analyse knowledge and awareness of target group about rules, norms and standards

Even though farmers and other value chain actors may be subject to numerous sets of rules and standards, they may not understand them or be empowered to respond. On the other hand, rules, quality standards, and norms may not be written down or may vary within and between market areas. They may also change in response to market supply.

In this step, it is important to assess the level of transparency in monitoring and enforcing the rules. For example: are quality requirements clearly set in contracts and translated in an explicit set of parameters that cannot be subject to discretional interpretations? Are independent parties involved in the monitoring process, or is it totally managed by powerful actors? Discretional quality controls, coupled with power asymmetries, can result in a monitoring system that disadvantages the poor. Furthermore, discretional rules can result in corruption.

In some cases, there may be collective monitoring and control of rules and standards by peers, which are set for collective trademarks, geographic indications, participatory guarantee systems and collective certification of farmer groups. These can play a key role in horizontal learning processes and in strengthening horizontal coordination (collective action).

In the Farmer Marketing School (FMS) approach used by the CIDA-funded Cambodia Agricultural Market Information Project (CAMIP), value chain actors (producers and traders) formalised the local grading standards by discussing the objective quality criteria and the parameters for each grade (Table 1). The objective was to come to a commonly agreed standard for grading.

**Table 1. Example of Farmer Marketing School grading table (Yard long bean in Kampot, Cambodia)**

| Criterion | Grade 1 | Grade 2 | Grade 3 |
|---|---|---|---|
| Length | > 45 cm | > 30 cm < 45 cm | < 30 cm |
| Colour | Dark green | Dark green | Any colour |
| Blemishes | No blemishes | < 5 spots/bean | > 5 spots/bean |



## Step 6
## Analyse how information and services are provided internally and externally

Services define the ways actors within and outside the chain assist other value chain participants to meet the requirements of rules and regulations. Services can be provided by actors within the chain, as in the case of leading buyers (or their buying agents) that directly help their suppliers achieve quality standards. Alternatively, services can be provided by indirect actors outside the chain, such as an NGO, an extension officer or an export promotion centre (Table 2).

The focus of service analysis is to understand who supports value chain participants (and through which means) to be competent suppliers within the coordination system, and to comply with rules and standards that are in place. This analysis can also help assess whether the level of support is adequate to the requirements of value chain upgrading.

The main questions to be addressed are: who provides assistance to value chain participants; which forms of assistance are available for different categories of value chain actors; what is the degree of satisfaction of different categories of actors with the services and assistance provided; and which linkages or services should be improved.

Particular attention should be given to understanding the ways in which actors within or outside the value chain provide assistance to less advantaged participants in understanding and complying with commercial and regulatory requirements.

**Table 2. Direct and indirect actors assisting firms to meet chain rules**

| | Change agents | Sources of data |
|---|---|---|
| **Indirect actors** | • Consulting firms<br>• Learning networks<br>• Government agents<br>• Certification bodies | • Interviews with consultants<br>• CEO or production control in firms<br>• Business Associations CEO or production control in firms<br>• Interviews with government officers (local and national) responsible for industrial policy |

**Table 2. Direct and indirect actors assisting firms to meet chain rules (Continued)**

| | Change agents | Sources of data |
|---|---|---|
| **Direct actors** | • Rule-setting firm<br>• Buying agent of rule setting firm<br>• First-tier suppliers, or other leading suppliers to rule-setting firm | • Supply chain management or purchasing function in purchasing firms<br>• CEO or production control in supplying firms<br>• Interviews with agents or CEO of recipient firms |

## What Should be Known after Analysis is Complete

After having followed all the steps, the analyst should have a clear picture of the coordination structures and rules, regulations, and standards of the value chain. Steps 4 and 5 should give a picture of the main challenges that governance structures pose for development of socially inclusive value chains, and Step 6 should help identify internal and external actors that can assist value chain actors overcome those challenges.

The key questions outlined below should be able to be answered:

- What are the value chain's coordination structures?
- What is the role of lead firms in coordination?
- Where do targeted populations fit into the value chain in its various coordination structures?
- What are the formal and informal rules that regulate the actions of value chain participants?
- How are rules monitored and enforced? Which are the sanctions and incentives used to make the rules effective?
- Do disadvantaged value chain actors have access to information about the formal and informal rules that shape their participation in the chains?
- Do female actors have the same access to information as their male counterparts? What services are delivered to women and men producers through the coordination structure?
- Are there effective systems to support participants in meeting the rules and requirements of the value chain?

Trust. Street vendors, who are mostly women, are an important part of the local food system in Hanoi.
Photo: ©2015CIAT/GeorginaSmith

# Tool 4
# Linkages, Power and Trust

# Introduction

Developing positive relationships, linkages, and trust between individuals, groups, and firms is fundamental for a well-functioning, competitive, and inclusive value chain. Good linkages and trust are necessary for effective cooperation and coordination between actors in the value chain. They are also an important focus of many interventions aimed at helping smallholder farmers, small agri-enterprises, and disadvantaged groups gain access to new market opportunities, information, and technologies.

Linkages and trust are two important forms of social capital that have significant influence over the structure, conduct, and performance of value chains. Linkages are the structural and observable business relationships between buyers and sellers of goods and services in value chains, as well as the connections with external institutions and indirect actors. In contrast, trust, values, and norms are subjective, intangible elements of social capital in value chains.

**Box 1: "Relationally Sourced Coffee", trust and linkages in the Specialty Coffee Sector**

Since the late 2000s a growing trend in the Specialty Coffee Sector is for roasters to pursue direct market linkages with suppliers, with the aim of developing greater trust in the quality of the coffee amongst consumers. Direct market linkages are an important ingredient in sustainable trading relationships in high-value chains and the development of niche market brands. This started with a movement towards "Direct Trade", initially involving smaller roasters travelling to coffee growing regions and purchasing small lots directly from farmers and cooperatives. Once this model gained popularity roasters started to purchase coffee through a direct channel in the country of origin, rather than buy from a coffee importer in the consuming country. These days, communication with suppliers in the country of origin is more often than not done via email and there is no longer any significant contact with, or commitment to, producers.

A number of socially conscious roasters are moving beyond the direct trade model, as they feel that without necessary governance and accountability, direct trade is becoming a trend and marketing strategy that does little to build long-term relationships and trust along the value chain. These roasters are moving towards a model of "relationally sourced coffee", which places the main emphasis on development of long-term, trust-based relationships. In practice, this means (i) committing to purchase coffee from suppliers over a long (multi-year) timeframe and investing in improving quality; and (ii) buying all of the production of a farm or cooperative (or, at the minimum, a sufficient proportion of the harvest to allow the relationship and investment to develop).

While relatively small-scale at present, this relationally sourced, trust-based model seems to have good potential. As one roaster puts it, *"We want these producers to know we are coming back, that their investments in their coffees are not a shot and prayer but grounded faith in our demonstrated commitment. Everywhere we have worked we have seen both quality and quantity increases, as the commitment and relationship deepens which ultimately means better and more faithful coffee experiences for our guests and community."*[1]

1. 'Coffee Sourcing Part 1: Commodities and Direct Trade', Saint Frank Coffee, July 2019, https://www.saintfrankcoffee.com/blogs/blog/relational-coffee-sourcing-part-1-commodities-and-direct-trade



Linkages and trust operate at micro-scales between individuals, households, and firms in the value chain. They also exist at higher meso and macro levels with district or national groups, associations, and institutions that operate in, or externally influence, the chain.

## Terminology

For the purpose of this tool:

**Linkages** are defined as the business relationship or connections between different actors, firms, and institutions in the value chain or network.
**Power** is the capacity or ability of actors to control, direct, or influence the behaviour of others or the course of events in the value chain.
**Trust** is social capital formed between two parties enabling a more efficient linkage through the reduction of transaction costs.

Strengthening the linkages and trust between the different actors in the marketing system will lay the groundwork for finding solutions to other constraints: establishment of contract systems; an upgrading of post-harvest and transportation systems; improvements in quality; and the effective use of market information.

Power, trust, and linkages are inextricably intertwined within the value chain. Organisations without linkages have little reason to "trust" each other, even if they do not "distrust" the other party. Conversely, trust might not be important if enforcement mechanisms exist to ensure compliance with a given set of rules governing their relationship (for example, contracts and other legal instruments). However, in the absence of effective enforcement mechanisms, linkages without trust may well be weak.

Linkages, power, and trust relationships exist along vertical and horizontal dimensions of value chains. "Vertical" linkages are the connections between actors along the chain. "Horizontal" linkages exist between actors at the same level of the value chain: e.g. farmers working together with other farmers, or competing companies pooling funds for applied sector research or cooperating in the export promotion and marketing sphere.


Market linkages. This Jakarta-based coffee roaster has developed direct trade relationships with coffee farmers on Flores island, providing new livelihood opportunities in the region.
Photo: Jeff Neilson

# Objectives

The main objectives of the analysis of linkages, power and trust are to:

- Define the linkages and relationships between different value chain actors;
- Understand how linkages, trust, and power relationships between different actors affects value chain performance and impacts different groups, including the poor and women; and
- Identify possible entry points and interventions to improve linkages and relationships between different actors that will lead to more competitive and inclusive value chains.

# Steps

The information and data needed for analysing linkages, power, and trust can be collected using key informant interviews, focus group discussions, and direct observations of key actors in the chain.

Information could also be acquired from participatory exercises with the same actors (e.g. just farmers), or a mixed group (e.g. input suppliers, farmers, traders, and retailers). In some instances, it will be useful to organise separate groups for women and men,

Market linkages. Buyers from modern retail outlets in Hanoi inspecting vegetables with farmers in Moc Chau, northern Vietnam.
Photo: Bui Thi Hang



low- and high-income households, or ethnic groups to get their unique perspectives. See Chapter 3 for more information on these data collection methods.

## Step 1
## Analyse linkages

Analysis of linkages involves identifying how organisations and actors are connected with each other, the reasons for those linkages, their strength, and whether they are beneficial or not.

Actors in the value chain link with each other because they perceive they will obtain some form of benefit. Identifying these benefits (or lack of them) goes a long way to understanding the constraints to better linkages and trust amongst value chain participants.

A series of criteria can be used to characterise the linkages and connections between individuals, groups, or organisations, both horizontally and vertically:

- **Existence of linkage** or connection
- **Reason** for the linkage
- **Importance** or strength of the linkage
- **Influence** between the different actors or groups
- **Frequency** of contact (infrequent; annually to very frequent; daily or weekly)
- **Formality** (informal, verbal agreements to written contracts or membership)
- **Trust and power** relationship between actors, firms, and groups (see below)

The following sub-steps can be used to collect and analyse information from chain actors about value chain linkages and connections:

- Identify and map the direct and indirect actors, and important external institutions and organisations providing support services and functions (using the Value Chain Maps developed in Tool 2);
- Define important sub-groups of actors (from Tool 2);
- Define a set of key criteria for characterising linkages (using the list above as a guide). A rapid appraisal may simply assess and describe the strength and nature of the linkages with other actors and groups;
- Develop a table or matrix of linkage indicators (columns) and key actors, sub-groups, organisations, and institutions (rows);
- Describe the horizontal and vertical linkages between actors, groups, organisations, and institutions they interact with

## Step 1
## Analyse linkages

(Continued)

using information gathered from interviews or activities with each target group;

- Qualitatively describe and evaluate each indicator. In some cases, analysts may also choose to develop a categorical or Likert scale to score each indicator. From these, an overall aggregate linkage score for each linkage group can be produced;
- Analyse and present results in a table or matrix format (an example is shown in Table 1). Aggregate linkage scores and characterisations can be produced for each individual respondent group. Results can also be presented graphically, for example in a Radar Chart like the one shown in Figure 1, or in an institutional mapping diagram, as discussed in Tool 2 and shown in Figure 2;
- Identify entry points and possible strategies and interventions where relationship and linkages between target groups and other key actors, firms or groups can be strengthened.

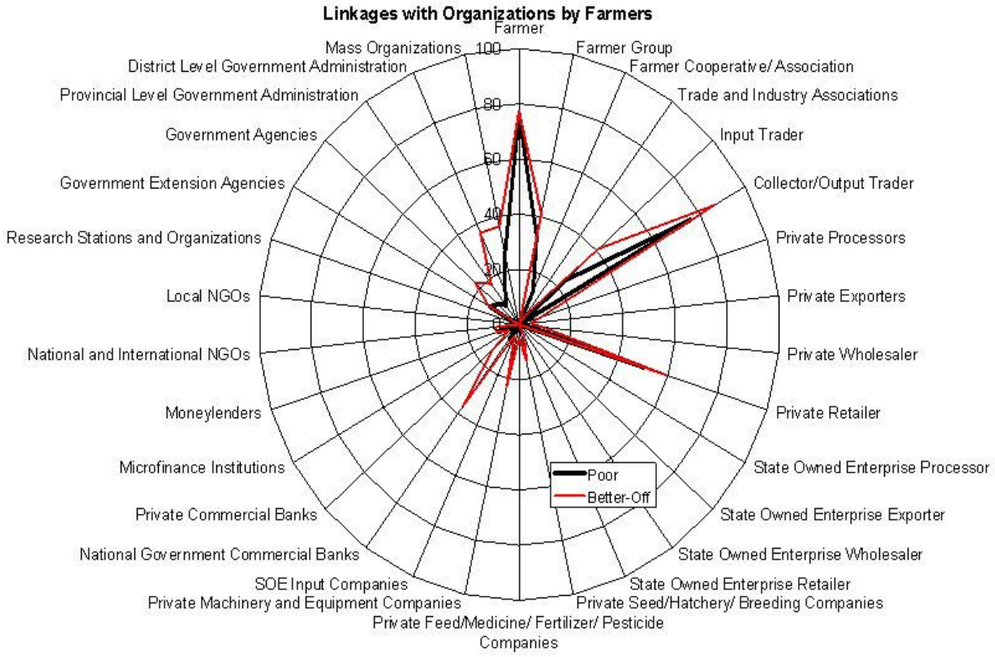



Figure 1. Linkages of farming households with different organisations



In the diagram, the percentage of farmers with linkages to each organisation/institution is shown, differentiated between poor and better-off households. The diagram shows that poorer farmers have fewer linkages than better-off households.

The guiding questions below can help explore linkages, power, and trust relationships for women and men, and different target groups in more detail:

- How do the linkages, power, and trust relationships differ between poor and better-off farmers, and between men, women, and other disadvantaged groups in the value chain? Why?
- Where and how can poor farmers, women, or other disadvantaged groups benefit from strengthening their linkages in the chain?
- How do powerful actors influence the distribution of benefits throughout the chain, particularly to disadvantaged groups? How can powerful firms and organisations benefit from more inclusive value chains?

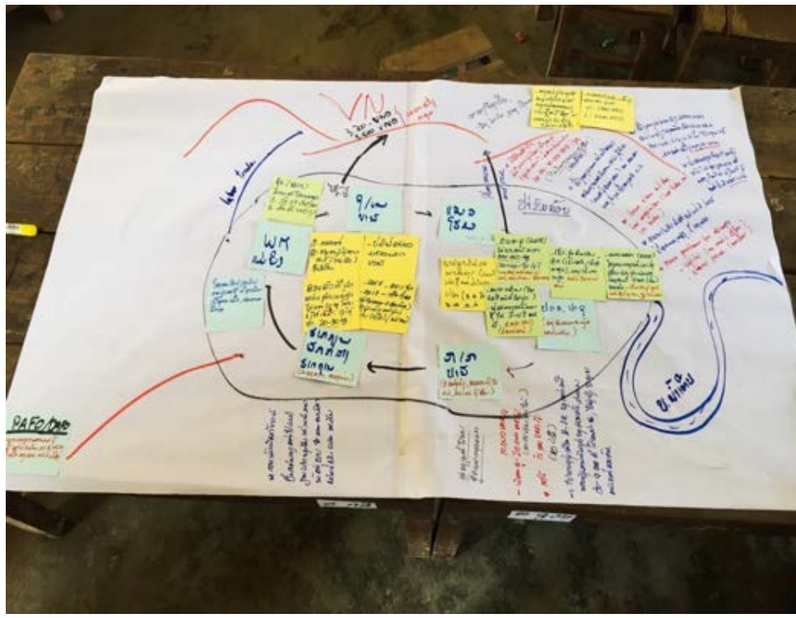


Figure 2. Institutional mapping example showing linkages between actors. Source[2]

2. I. Vagneron et al., *Understanding the maize sector in Huaphanh Province, Lao PDR*, Paper prepared by CIRAD for Australian Centre for International Agriculture Research (ACIAR) project SMCN/2014/049 – Improving maize-based farming systems on sloping lands in Vietnam and Lao PDR, September 2019.

| Table 1. Matrix of linkage indicators and other actors, groups, and organisations the target informant groups connect with | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Existence of linkage | Purpose | Importance | Influence | Frequency | Formality | Overall assessment |
| Input supplier | | | | | | | |
| Farmers | | | | | | | |
| Farmer group | | | | | | | |
| Industry association | | | | | | | |
| Local collector/ trader | | | | | | | |
| Money lender | | | | | | | |
| Bank or financial institution | | | | | | | |
| Extension service | | | | | | | |

## Step 2
# Analyse power

### Importance of power

Power is the capacity or ability to control, direct, or influence the behaviour of others or the course of events in the value chain. Actors who have exclusive access to key assets and resources are more powerful and have the capacity to influence others in the chain. Key assets can be both physical resources (e.g. capital, land, or credit) and intangible resources (market information, knowledge, personal relationships, or reputation).

Power relationships and asymmetries (imbalances) can exist between individuals and groups such as households, firms, institutions, and even consumers. Power relationships can exist between actors in the chain (e.g. the influence of a lead firm on growers and suppliers), or horizontally amongst actors and sub-group at the same level in the chain (e.g. the influence of a wealthier, larger scale commercial farmers on smallholder farmers).

Developing inclusive value chains requires understanding the relative positions of power and influence between actors, firms, and groups, and the impacts of power imbalances. This is particularly important for disadvantaged individuals or groups such as the poor, women, ethnic groups, smallholder farmers, workers or small


In the Semendo region of Sumatra, farmers grow Robusta coffee for large-scale commercial markets while staying in field huts for the harvest.
Photo: Jeff Neilson

firms. Depending on the situation, and associated motivations, powerful actors such as lead firms can have positive or negative influences on the performance of a value chain, and particularly on less powerful or disadvantaged actors.

Dallas et al. (2017[3], 2019[4]) have developed a typology of power within value chains according to two dimensions: (i) the actor interactions (one-on-one or collective); and (ii) the use of power (directly or in a diffuse manner). Combining these two dimensions gives a set of four different power types within value chains (see Box 2).

**Box 2: Types of power within global value chains**

**Bargaining power** (One-on-one/direct) is the most common form of power recognised in value chains. It usually refers to linkages between buyers and suppliers. In this way, it is similar in concept to 'lead firm power'. Bargaining power depends on the lead firm's production expertise, control over distribution channels, design, and customer relationships in end-markets.

**Demonstrative power** (One-on-one/diffuse) refers to the effect that a firm's relationship with a supplier has on influencing the behaviour of other suppliers and would-be suppliers without the firm exerting direct power over them. This may include, for instance, the transmission of new requirements or preferences, leading to a particular type of upgrading that may induce adaptation among competing suppliers.

**Institutional power** (Collective/direct) is exercised by formally organised groups such as business associations, multi-stakeholder initiatives, or governments. Rather than stemming from resources controlled by a single organisation, as is the case with bargaining power, institutional power is dependent on the strategic actions of groups of actors, or on compliance with the rules set by these actors. Hence, institutional power can be weakened if the group of actors exhibits significant collective action problems.

**Constitutive power** (Collective/diffuse) manifests itself in collective linkages without an institutionalised focal point that directs influence. Instead, it stems from individuals and groups acting in an uncoordinated but collectively powerful manner— for instance, by providing a growing demand for a certain product, or by acting in accordance with existing or emerging norms.

Sources[4,5]

3. M. Dallas, S. Ponte, T. Sturgeon, *A typology of power in global value chains*, Working Paper in Business and Politics 92, Copenhagen Business School, 2007, https://openarchive.cbs.dk/bitstream/handle/10398/9503/DBP%20Working%20Paper%2092.pdf?sequence=4
4. M. Dallas, S. Ponte and T. Sturgeon, 'Power in global value chains', *Review of International Political Economy*, vol. 26, no. 4, 2019, pp. 666-694, https://www.tandfonline.com/doi/full/10.1080/09692290.2019.1608284
5. J. Grabs and S. Ponte, 'The evolution of power in the global coffee value chain and production network', *Journal of Economic Geography,* vol. 19, no. 4, July 2019, pp 803–828, https://doi.org/10.1093/jeg/lbz008

Trust and power. Farmers waiting to negotiate vegetable sales with traders in the Aungban market in southern Shan state of Myanmar.
Photo: FocusGroupGo/Rodd Dyer

| Box 2: Types of power within global value chains (continued) | | |
|---|---|---|
| | **Direct interaction** | **Diffuse interactions** |
| **One-on-one** | Bargaining power (operates in firm-to-firm relations with various degrees of asymmetry) | Demonstrative power (operates through informal transmission mechanisms along value chains) |
| **Collective** | Institutional power (operates through government regulation, multi-stakeholder initiatives or other institutionalised forms) | Constitutive power (operates through broadly accepted or taken-for-granted norms, conventions and best practices) |

## Step 2
## Analyse power
(Continued)

The influence and control held by powerful actors or groups can be used for positive benefit, as when business models and practices are inclusive, enabling small enterprises and disadvantaged groups to access technologies, information, and credit. On the other hand, power imbalances can be associated with negative outcomes, such as an excessive concentration of profits within a value chain, whereby a few benefit at the expense of others.

A set of indicators can be used to evaluate the relative power and influence of different actors and sub-groups operating in the chain. An example of indicators include the relative ability of different actors and groups to:

- control and influence prices, supply, or demand through greater financial capital, operating scale, geographic spread, and buying power;
- control access to or quality of land, labour, and natural resources;
- set and enforce product and process standards and quality specifications;
- impose and enforce penalties and sanctions;
- set and enforce rules and regulations;
- own permits, certificates, brands, or trademarks required to access markets;
- access and control critical information and knowledge;
- access and control key technologies and innovations; and
- access and influence communities, government, regulatory bodies, and financial institutions.



### Analysing the relative power of key actors and sub-groups

A qualitative assessment of power held by different actors can be undertaken using the following sub-steps as a guide:

- List all the relevant direct and indirect actors, including important target sub-groups, from the Value Chain Maps and categorisations developed in Tool 2;
- Define indicators of power relevant to the value chain (drawing from the list above and bearing in mind the four types of power described in Box 2). A rapid assessment might simply ask respondents which actors have most power in the chain and why;
- Qualitatively assess the relative ability to control and influence other actors and sub-groups over a range of indicators of power (from nil to very high). Use a matrix and scores or ranks if helpful;
- Describe whether the influence may be positive or negative, and why;
- Develop an aggregated assessment and characterisation of the overall position of power (from nil to highly powerful) for each actor and sub-groups.
- Identify areas where target groups are being adversely impacted or constrained by control and influence of powerful actors; and identify entry points where interventions could be implemented to promote more inclusive value chains.

Cooperation between farmers. Women show the vegetables they harvest from their community garden in the Southern Philippine Province of South Cotabato, Mindanao.
Photo: ACIAR/Jeoffrey Maitem

## Step 3
# Analyse trust

### Importance of trust

Trust is the firm belief in the reliability, truth, or ability of someone, a product, or process in the value chain. Trust results in the sharing of knowledge and resources when firms in a value chain interact and collaborate[6].

High levels of trust between actors and firms is an essential ingredient of agri-food value chains that are efficient, competitive, and inclusive. In many markets, it is becoming essential to create, maintain, and communicate trust between companies across the entire food chain[7]. Individuals and firms operating in value chains also need to trust that buyers will continue to order, orders will be delivered consistently and on-time, product specifications and quality requirements will be met, prices will be fair, payments will be made, required operating procedures and rules will be followed, food will be safe and free from contaminants, and shared information and advice will be reliable. Trust is an essential ingredient for collaboration and cooperation between firms and actors in value chains, which is necessary for competitiveness and survival in global markets. Trust is particularly necessary to overcome challenges, improve efficiency, and reduce costs in global value chains where buyers and sellers operate over vast distances across multiple administration and country boundaries.

Trust involves personal attributes and values such as integrity, fairness, loyalty, transparency, reciprocity and competence[8]. Developing high levels of trust between actors can be an efficient alternative or complement to the enforcement of rules, standards, and regulations that govern value chains.

There are numerous reported advantages of increasing trust and cooperation in value chains. Benefits include: reduced transaction costs; reduced uncertainty and financial risk; improved information sharing, communication flows, technology exchange and cooperation between upstream and downstream firms; enhanced understanding of market conditions; better adaption to market change; and strengthened competitiveness.

6. J.H. Dyer and H. Singh, The Relational View: Cooperative Strategy and Sources of Interorganizational Competitive Advantage, cited in J. Reuer (Ed), *Strategic Alliances. Theory and Evidence,* Oxford, Oxford University Press, 2004.
7. M. Fritz and C. Fischer, 'The Role of Trust in European Food Chains: Theory and Empirical Findings', *International Food and Agribusiness Management Review*, vol 10, no. 2, 2007, https://EconPapers.repec.org/RePEc:ags:ifaamr:8185.
8. C.E. Riddalls, 'Quantifying the Effects of Trust in Supply Chains During Promotional Periods', *International Journal of Logistics*, vol. 5, no. 3, 2010, pp. 257-274.



**Box 3: Gendered relationships, linkages and trust in the case of Hanoi's street vendors**

Very successful women street vendors often engage in their business through a high trust chain. For example, Ms. Truc, a pork seller, buys pork from her brother, who always keeps her the cuts that are most popular with customers – in this way, she avoids purchasing parts that may remain unsold. She then sells the product in the area where her married sister lives. The choices of agricultural products, the locations at which to sell, and the scale of business are not simply driven by consumer demand and financial capacity, but are embedded within the social network available to the vendors, shaping an informal food trading sector through implicit rules and invisible regulations.

Male street vendors, however, tend to depend on a formal low-trust chain. Định, for example, hires a man who purchases fruits for him and delivers them to his hostel every morning. Sáng, a sugarcane seller, does the same. He pays for the delivery service to save time in the morning. Unlike female vendors, men also tend to depend on their own labour, or on hired labour, and on capital, knowledge, information, and skills, without any collaboration or mutual support relationships.

In this way, gendered relationships and linkages create gendered strengths and challenges in this informal food trading sector.

Source[9]

The level of trust between individuals, groups and firms in value chains is influenced by the following factors: shared values; communication; the type and quality of the information shared; partner reputation; rule of law; and uncertainty behaviour[10]. Developing trust is challenging and takes time, but can be destroyed in one incident. Once trust is lost (for example, through a food contamination scare with consumers), it is difficult - often impossible - to rebuild.

Trust can manifest itself in value chain relationships in different ways. Table 2 lists some key features that characterise exchange relationships in value chains based on low or high levels of trust.

9. N. Kawarazuka, C. Béné and G. Prain, '*A*dapting to a new urbanizing environment: gendered strategies of Hanoi's street food vendors', *Environment & Urbanization*, vol. 30, no. 1, 2018, pp. 233-248.
10. S. Ruel, L. Ouabouch and S. Shaaban, 'Supply chain uncertainties linked to information systems: a case study approach', *Industrial Management & Data Systems*, vol. 117, no. 6, 2017, pp. 1093-1108, https://doi.org/10.1108/IMDS-07-2016-0264

**Table 2. Differences between chains characterised by low and high levels of trust**

| | Low Trust Chain | High Trust Chain |
|---|---|---|
| **Length of trading relationship** | Short term, transactional | Long term |
| **Ordering procedure** | Open bidding for orders<br>Prices negotiated and agreed before order commissioned | Bidding may not take place<br>Price settled after the contract is awarded |
| **Contractual relationship** | Supplier only starts production on receipt of written order | Supplier more flexible about instruction<br>Would start production without written order |
| **Inspection** | Inspection on delivery | Little or no inspection. |
| **Degree of dependence** | Supplier has many customers<br>Customer has multiple procurement sources | Fewer customers for supplier<br>Single or dual sourcing by customer |
| **Technical assistance** | Expertise rarely pooled<br>Assistance given only when paid for | Extensive unilateral or bilateral technology transfer over time |
| **Communication** | Infrequent and through formal channels | Frequent and often informal |
| **Price determination** | Adversarial, with hiding of information | Non-adversarial |
| **Credit extended** | Punitive or no-credit extended | Ready access, longer payback period, flexible terms |
| **Outsourcing payment terms** | Long delays in paying agents and informal economy producers | Payment on receipt of finished goods |



## Step 3
## Analyse trust

(Continued)

The analysis of trust between actors can be based on the following guiding questions:

- Do actors and firms have similar shared values?
- Is there a high degree of dependency and high level of information sharing?
- What is the quality of information exchange (timely, accurate, complete, and reliable)?
- What is the frequency and quality of communication?
- How long has the relationship lasted?
- When and how are prices set?
- Is there a contract or an oral arrangement?
- What are the terms of payment?
- Are there control and inspection procedures?
- Is credit provided with reasonable terms and flexibility?
- How are disputes settled?

A qualitative assessment of overall trust between actors can be developed by evaluating, scoring and weighting these individual characteristics. Methods similar to the analysis of power can be used.

For a rapid assessment, respondents can be asked about their overall level of trust in other actors in the value chain. The level of trust could be scored according to a scale (for example: (-1) distrust; (0) no trust; (1) low level of trust; (2) medium level of trust; (3) complete trust). The data on trust from different value chain actors can then be inserted in a matrix, as shown in Table 3.

**Table 3. Example of matrix of trust levels between actors**

| | Farmers | Traders | Processors | Moneylenders |
|---|---|---|---|---|
| **Farmers** | 3 | 2 | 1 | -1 |
| **Traders** | 3 | 0 | 2 | 0 |
| **Processors** | 1 | 2 | 2 | 2 |
| **Moneylenders** | 2 | 0 | 0 | 2 |

## Step 3
## Analyse trust

(Continued)

From Table 3, it is possible to see what level of trust actors have for others in the chain, and to check if trust is reciprocal. If it is true that informal arrangements are the result of trust, it has also to be considered that informality makes it more difficult to understand the terms of the arrangement. Whether or not trust is reciprocal can be particularly important to understanding the position of the poor, as it gives a rough idea of the extent to which an agreement is based on trust, or simply the result of dependency (no other alternative partners available). In the example above, farmers have some trust in traders, while traders have complete trust in farmers; the exchange is therefore almost reciprocated.

A key final element of analysing trust is to identify the key areas where trust relationships have significant positive or adverse impact on the poor, women, or other target groups. Next is to identify entry points and possible interventions where enhancing trust can generate positive outcomes for target groups, and improve overall value chain function.

## What Should be Known after Analysis is Complete

After having followed all the steps, the following should be known:

- The linkages and relationships between different value chain actors;
- How the linkages, trust, and power relationships between different actors affect the value chain and impact on the livelihoods of the poor, women or other target groups; and
- The possible entry points and interventions that could lead to improved linkages, trust, and relationships between different actors and reduce power imbalances in order to develop more inclusive value chains.

Buyer product standards. A trader inspects the quality of mangos for export to China from Dong Thap province, southern Vietnam.

# Tool 5
# Costs and Margins

# Introduction

Before entering a new market or business, or adopting a new technology, a person must first determine whether this is profitable. This is particularly important for poor people who have limited resources and so cannot afford to choose the wrong sector, market, or product.

Expected revenues, costs, and margins for different end-products, market segments, and value chains can be analysed and compared. These analyses can help identify and compare the innovations that can improve production efficiency and net incomes, the investments required, or entry points for scaling up.

Understanding the revenues, costs, and margins for different actors and groups in the value chain, both horizontally and vertically, can also help identify if, and how, the poor, women, or other disadvantaged groups could increase their income. In other words, is it possible to upgrade the position of the poor in the chain?

If investment and operating costs for starting and running a business are high, it may also be a problem for the poor or other groups to participate in the value chain. Understanding how costs and margins change over time can also help predict future growth or decline of the chain. Margins will be affected as production prices and input costs (e.g. petrol and labour costs) increase or decrease over time. Therefore, a sector that is profitable now may not necessarily be profitable next year.

Production of certified safe vegetables in Moc Chau for markets in Hanoi has enabled farmers to significantly increase their incomes. Photo: Bui Van Tung



**Box 1: Understanding relative contributions to total income, revenue, and costs**

When analysing and considering options for farmers and businesses, it is important for researchers to understand the relative contribution a specific value chain or product makes to total net income, revenue, and costs. Farming households and agribusinesses often generate income from multiple sources. In doing so, they generally allocate their available assets (land, labour, capital, human, social) into a combination of enterprises and activities that optimise returns, reduce risks, and best meets their needs. The aim for households could be to diversify revenue, improve cash flow, or reduce exposure to unforeseen risks.

For example, a smallholder family in the mountainous areas of Vietnam may grow maize, have plum trees, grow vegetables, and raise some pigs, all for cash income. The husband may also drive a truck or sell his labour for a period of the year to nearby dairy farms. While the wife may also make handicrafts to sell in the local market. Therefore, when identifying possible value chain sectors, products, or upgrading options, it is important to understand how each sector contributes to the entire household or business economy. Calculating these financial performance measures can assist this assessment.

# Objectives

The main objective of cost and margin analysis is to:

- Understand the costs of entering and operating in a value chain for the poor and other actors;
- Compare the performance and opportunities between different value chains, end products, and market segments;
- Compare the different actors and groups operating in the value chain, and identify opportunities for improvement;
- Understand changes in value chain performance over time, and the risks and opportunities this provides;
- Compare the performance of actors and groups to various benchmarks; and
- Identify possible entry points and interventions to increase revenues, margins and total income, particularly for target groups.

## Take Note

One of the aims of studying costs and margins is to identify ways to increase the margin per product unit. However, this does not always lead to reductions in poverty: if a poor farmer increases their profit margin per unit, but sells fewer products, then their absolute income may well decrease. Therefore, researchers should always combine cost and margin analyses with an analysis of total revenues or income per actor. More information on income analysis is presented in Tool 6.

Analysis of revenue, cost, and margin in a value chain is only useful if producers are considered as micro-entrepreneurs (i.e. small commercial actors seeking the most profitable use of their limited resources in the marketplace) rather than as subsistence actors. In order to use this type of analysis effectively, it must be recognised that there are important differences between the way economics and accounting treat costs that should guide both analysis and decision-making in pro-poor and inclusive value chain development.

# Steps

The following steps can be followed to analyse revenue, costs, and margins.

Prior to analyses, and similar for all tools, the categories of actors and target groups, and the market segments within the value chain should be identified. The Value Chain Mapping done in Tool 2 can be used to describe categories of actors, target groups, and market segments.

## Step 1
## Estimate opportunity costs for labour, land, and capital

Good value chain analysis should estimate the opportunity costs faced by women and men farmers, as these affect choices that they will make about what to produce in a given season. Many farmers, if asked why they shifted from one crop to another within a season, will report that they thought they could make more money. They are thinking about the relative attractiveness of different options but may or may not consider all the costs or foregone alternatives involved. For example, the additional labour required for a new crop, especially for women's unpaid labour, or the possibility of renting out land instead of growing on it.

Terminology

**Opportunity costs** are the costs of employing labour, capital, or land in a specific way, compared to pursuing alternative business options. Opportunity costs are useful in economics for evaluating what alternative uses of resources could generate the most income and wealth for producers.

**Financial costs** are the monetary expenditures that a chain actor incurs carrying out an activity, which are usually found in any accounts (formal) or records (informal) being kept by the actor. Financial costs usually do not consider the alternative uses for resources.



To estimate the real costs of participation in a value chain, cost calculations should account for opportunity costs for women and men farmers and family labour, the use of land, and capital.

This means assigning realistic estimated (imputed) values to the time, land, and capital that is allocated to the activity by the value chain actor and their family. If these values are not assigned, analysis will unintentionally treat each of these as free resources, distorting the true picture of cost, profitability, and sustainability for value chain upgrading. This is particularly important as small producers try and become more commercially oriented. Guidelines for incorporating these values into cost calculations appear in the box below.

Terminology

**Opportunity cost for labour.** The opportunity cost for labour is a measure of employing scarce labour resources in a chosen activity. For family labour, this is generally equal to the cost that would be incurred if a person is employed to do an activity normally carried out by a family member. Alternatively, it is the income the family member would lose by not hiring themselves out to perform an activity on someone else's farm and instead doing the same activity on their own farm. However, employment opportunities in the local construction industry or agribusiness firms may increase the opportunity cost of own farm labour for a rural family.

It is important to realise there can be seasonal variability in the opportunity cost of labour. In a rice production area, the opportunity cost for a family member of weeding could be zero (or close to zero) if there is no alternative activity for the farmer to be employed in because of a low labour demand on other farms. Conversely, at times of transplanting and harvesting, when there is a high labour demand and therefore the option of being employed in these activities on other farms, there can be a significant opportunity cost associated with labour.

As economies grow and industrialise, there are often increasing opportunities for farm family members to work off-farm, either on a casual basis or in more permanent wage-earning activities. As wage earning opportunities increase, the seasonality of labour demand also decreases, as farm family members can access more stable income earning options.

Terminology

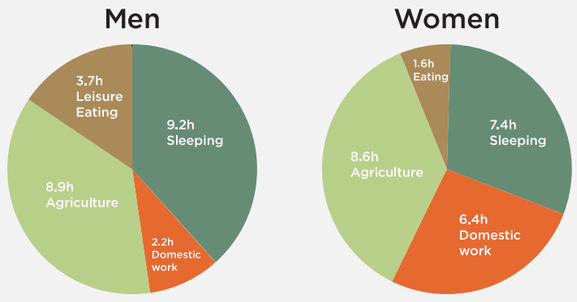
**Opportunity cost of land.** The commonly used definition of opportunity cost of land is the return on leasing the land to another producer (or for another use) instead of the farmer producing a crop on it themselves.

**Opportunity cost of capital.** The opportunity cost of capital is equal to the interest earned if the capital was deposited in a bank or microfinance institution (MFI) or lent to an individual.

**Box 2: Recognising women's unpaid labour for agricultural and domestic work**

Women's unpaid work, for both agricultural and domestic activities, is often under-recognised or underestimated, particularly in contexts where men and youth engage in paid work. In areas where farmers live far away from their farms, women may have to walk while men ride a motorbike. A key guiding question for gender inclusion is whether introducing a new technology runs the risk of increasing women's unpaid on-farm labour burden (e.g. more time for weeding, more frequent visits to farms, heavy labour for harvesting). In some cases, proposed interventions can create an extra burden for women while they do not have full control over additional profit brought by their labour and time.

Women usually engage in more unpaid domestic work than men. The figure below shows the 24-hour time allocation by gender in a Hmong ethnic minority village in Vietnam. Both men and women spend around 8-9 hours farming. Women's sleeping time is 2 hours less than men's and they spend 4 hours more on domestic work. Women do not have leisure time, and resting time is only 1.6 hours , compared to 3.7 hours for men. Men often go out to drink in the evening, 3-4 times per week, and come back home at around 9 or 10 pm, which seems to be an integral part of their social activities. Young men play sport in the evening after they're back from the field. There were minor differences between younger and older groups in time allocation and therefore the figure below shows an average from two groups, the old and the young.




24-hour time allocation for men and women in a Hmong ethnic minority village in Vietnam

Source[1]

Warning

**Accuracy of Data**
It may not always be possible to obtain accurate figures on production and other costs for farmers or business, for example for production costs. Often this is because they may not keep accurate records.

Data may sometimes have to be calculated in an indirect way, for example by asking a trader how much time (hours/day, number of days) and funds (distances covered per day, means of transport) they spend collecting information and establishing contacts (information costs) without actually performing any transactions.

In both cases, it will be necessary to interview a sample of each actor group to obtain approximations of these costs. Even then, it may still be necessary to cross-check information collected in this way with other sources of information.

## Step 2
## Calculating operating costs and investment costs

The next step is to calculate the costs of an actor's activities. Often only operating and investment costs are calculated; however, transaction costs and regulatory costs should also be considered. Appropriate opportunity costs should be included amongst the fixed and variable costs when calculating land, labour, and capital costs.

**Operating costs** can be divided into variable costs and fixed costs.

**A. Variable costs** are costs that change in direct relationship to the level of production in a specific production or sales cycle. Variable costs are relevant to enterprise decision-making in the short run. Examples of variable costs in agriculture include fuel, fertiliser, seed, chemicals, animal feed, veterinary medicines, and water. More complex examples of variable costs include the casual labour a farmer requires for harvesting or planting, or the extension staff an agribusiness firm employs to support groups of contracted outgrowers in a given season.

In the case of cattle raising, variable costs include, amongst others, livestock feed and vaccinations. If a farmer has ten cows

1.*Exploring opportunities and challenges in agricultural development through the gender lens: A case study in a H'mong community, Dien Bien province in Vietnam*, Technical report, FST/2016/152 and AGR/2017/008, March 2018.

## Step 2
## Calculating operating costs and investment costs

(Continued)

and decides to raise two more, s/he need proportionally more food and vaccinations for the two new cows.

It is also important to correctly value the labour input from the family. In case of cattle raising, women may need to spend additional time and labour to feed the cows and clean their stalls every morning. These labour costs (and women's unpaid work in particular) are often overlooked.

**Table 1. Examples of operational costs in a farm enterprise**

| Variable Costs | Fixed Costs |
|---|---|
| Seeds | Office supplies |
| Fertilisers | Insurance |
| Chemicals | Legal and accounting fees |
| Animal feeds | Utilities |
| Veterinary medicines | Rent |
| Packaging materials | Repairs and maintenance |
| Wages | Depreciation |
| Fuel | Overheads |
| Opportunity costs of own labour | Finance expenses (interest and bank charges)<br>Opportunity costs of capital |

### Take Note

Instead of simply adding the totals for each of the variable or fixed costs, it can be worthwhile to assign relevant cost types to different activities performed by the same actor. For example, the costs for per diems and fuel for extension officers employed by a company contracting smallholder farmers under an outgrower arrangement could be separated over (i) the recruitment and contracting of farmers; (ii) training activities in accordance with the production cycle (e.g. nursery management, land preparation and transplanting, field management, pest and disease control, harvesting, and post-harvest handling); and (iii) marketing of the produce.



Most variable costs are easy to calculate as they change in relation to the level of output. However, there are some exceptions, such as transportation costs. These do not always change in proportion with the volume produced or traded. For example, a 25 tons truck can transport 25 ton of bamboo, but also 10 tons and, over short distances, even 40 tons. Therefore, transportation costs of bamboo can vary depending on the total amount of bamboo that is transported. If real costs are not known, a researcher needs to make assumptions about the average costs. The following example in Box 3 presents one method of calculating transport costs.

**Box 3: Example of calculating transport costs**

Assume that there are $20m^3$ of space available in a truck and that it costs $500 to hire the truck. A container of $0.2m^3$ holds 10kg cucumbers and a container of $0.5m^3$ holds 15 kg chili peppers.

**Then the transport cost for cucumbers per container and per kg is ...**

$\$500 \div (20m^3 \div 0.2m^3) = \$5.00$ per container and $\$5.00 \div 10$ kg = $0.50 per kg

**While the transport cost for chili peppers per container and per kg is ...**

$\$500 \div (20m^3 \div 0.5\ m^3) = \$1.25$ per container and $\$1.25 \div 15kg = \$0.083$ per kg

Source[2]

Another cost that is often ignored is the cost of product losses. Particularly if products are perishable, a certain amount of the traded products can often be lost. The example in Box 4 shows how these losses should be calculated for.

2. Agrifood, *Training Course on Integrating Value Chain Analysis and Methodologies into Policy Analysis: Value Chains Development Training Project*, Prepared by Agrifood Consulting International for the Northeastern Region Economic and Social Development Office, National Economic and Social Development Board of Thailand (NESDB), Khon Kaen, Thailand: p. 518, 2004.

**Box 4: Accounting for product losses**

Assume 15% of the product is damaged and lost. This means that 1 kg of cucumbers purchased by a trader results in 850 g (0.85 kg) available for sale to consumers. The trader buys cucumbers "from farmers" for $6 per kg and marketing costs are $1.50 per kg. The selling price of cucumbers is $9 per kg.

**The costs are**

1 kg purchased at $6 per kg = $6.00

1 kg packed and transported at $1.50 per kg = $1.50

---

Total Costs = $7.50

Sales Revenue $9 x 0.85 kg = $7.65

Thus, the margin to the trader = $0.15

---

Below is an example of the more typical, and wrong, method of calculating margins.

1 kg purchased at $6 per kg = $6.00

1 kg packed and transported at $1.50 per kg = $1.50

15 percent losses or $6 x 0.15 = $0.90

---

Total Costs = $8.40

Sales Revenue or $9 x 1 kg = 9.00

Thus, the margin to the trader = $0.60

The second calculation is wrong because the trader is obtaining revenue from produce which has already been lost.

**B. Fixed costs** are costs that are independent of the scale or level of activity.

In the cattle example presented in A: fixed costs are items such as investments in stables and land. Even though the farmer decides to raise two more cattle, there is usually no immediate need to buy additional land or build a new stable. Other examples of fixed costs include depreciation (replacement) of assets, interest on long-term loans and, in more advanced businesses, promotion expenses, stationeries, and the salaries of office personnel (not related to the primary production process).

**Take Note**

As fixed costs do not change with the level of production, there is a risk that certain costs are not acknowledged or reported by actors in a value chain. Also, certain costs apply to more than one product. For example, a cattle raiser may also raise pigs that are kept in the same stable. The costs for the stable should therefore be split between the cattle and the pigs. If not, the cost estimates may be too high, or too low.



Opportunity costs should also be included among the appropriate fixed and variable costs; for example, when calculating labour, land, and capital costs.

Sometimes it may be difficult to classify a cost as variable or fixed. However, regardless of which choice is made, it is important to be consistent throughout the analysis.

**Table 2. Example of Operational Costs (Fixed and Variable) for a dairy cow enterprise**

| | | |
|---|---|---|
| **Variable costs** | **Herd & shed costs** | 1. Artificial insemination: inseminator, semen, drugs associated with reproductive management |
| | | 2. Young stock: raw milk or calf milk replacer, concentrates and roughages, and herd management to point of calving |
| | | 3. Animal health: veterinarian visits, drugs, vaccines, and drenches |
| | | 4. Milk harvesting: rubber liners, detergents and sanitisers, maintenance of milking machines, hot water, transport to milk collection centre, cooperative commission |
| | **Feed costs (for milking and dry cows)** | 1. Purchased concentrates: formulated or ingredients |
| | | 2. Purchased forages: grass, roughage by-products |
| | | 3. Home-grown forages: fertilisers, irrigation, processing/ storage, weed and pest control |
| | | 4. Machinery: fuel and oil, repairs and maintenance |
| **Fixed costs** | **Cash overhead costs** | 1. Paid labour |
| | | 2. Finance: interest, bank fees |
| | | 3. Rent |
| | | 4. Administration: office equipment, insurance, telephone, other |
| | **Imputed overhead costs** | 1. Family labour, such as operator's allowance |
| | | 2. Depreciation |

Source: Adapted from[3]

3. J. Moran (ed.), *Business Management for Tropical Dairy Farmers*, CSIRO Publishing, DOI 10.1071/9780643097148, 2009, https://ebooks.publish.csiro.au/content/business-management-tropical-dairy-farmers

Calculating investment costs, transaction costs and regulatory costs can also provide deeper insights about specific types of costs a new or expanding farm or agribusiness might expect.

**Investment costs** are the capital costs required to establish or improve a business. In formal accounting, investment costs are considered a type of fixed cost. In inclusive value chain analysis and development, investment costs should be analysed as a key potential obstacle to entering and participating in a value chain.

In other words, what assets does an actor need to purchase to be able to establish and run their business? Finding this out is important whether in a certain value chain or market segment is accessible to the poor. For example, entry into a high-quality market segment for processed fruit products may require large investments in modern processing equipment. So even though a farmer produces the right raw material, the market is not accessible. A complete picture of investment costs is also relevant for calculating depreciation costs.

## Take Note

Depreciation is the cost associated with the wear of capital goods, such as machines and equipment, which need to be replaced after a while. Companies need to save money to be able to pay for these replacements. The costs of these are called depreciation costs. Understandably, poor farmers and micro enterprises usually do not calculate depreciation costs. They need all their income to survive.

**Transaction costs** are expenses incurred when buying or selling a good or service. Hobbs[4] classified transaction costs in agricultural marketing systems into information, negotiation, and monitoring or enforcement costs.

Hobbs identifies some specific types of transaction costs for agribusiness firms that link with large numbers of small farms within a value chain:

- The bureaucratic costs associated with managing and coordinating integrated production, processing, and marketing.
- The opportunity cost of time used to communicate with, and coordinate farmers.
- The costs involved in establishing and monitoring long-term contracts.

4. J.E. Hobbs, 'Measuring the Importance of Transaction Costs in Cattle Marketing', *American Journal of Agricultural Economics*, 1997, pp. 1083–95.
5. M. von Lampe, K. Deconinck and V. Bastien, *Trade-Related International Regulatory Co-operation: A Theoretical Framework*, OECD Trade Policy Paper No. 195, OECD Publishing, 2016, https://doi.org/10.1787/3fbf60b1-en



- The screening costs linked to uncertainties about the reliability of potential suppliers or buyers, and the uncertainty about the actual quality of the goods.
- The transfer costs associated with the legal or physical constraints on the movement and transfer of goods.

**Regulatory Costs.** Meeting the requirements of different regulations or standards for domestic and export markets can generate significant costs. As noted in Tool 4, the increasing globalisation of value chains has led to increasing public and private standards being applied to different market channels within value chains. Von Lampe et al.[5] classify three different categories of regulatory costs applying to international value chains – these could equally be applied to domestic markets:

- Information costs – identifying and processing the information on relevant regulatory and standards requirements in the target market
- Specification costs – adjusting the product or production process to the regulatory requirements of the importing country
- Conformity assessment costs – verifying and proving that these requirements have actually been met

Once all the different cost types have been calculated it is possible to present the figures in a table for different actors (e.g. Table 3). It is important to note that in Table 3, investment, regulatory and transaction costs are embedded in (and not added to) total operating costs, and may comprise both fixed and variable cost elements.

**Table 3. An example of presenting cost compilation across actors in the value chain**

| Cost Type | Actor 1 | Actor 2 | Actor 3 | Actor 4 |
|---|---|---|---|---|
| **Operating Costs - Variable** | | | | |
| **Operating Costs - Fixed** | | | | |
| Investment Costs | | | | |
| Transaction Costs | | | | |
| Regulatory Costs | | | | |
| **Total Costs** | | | | |

## Step 3 Calculating revenues

After the costs, revenues for each actor or group need to be identified. Revenues are calculated by multiplying the volume of product sold (Q) with the selling price (P), then adding additional sources of income, such as revenues from selling the production waste.

Revenues = (Q * P) + other sources of income.

An example of this last source of income is in the bamboo sector, where leftovers are used for producing paper pulp or fuel.

Prices will often vary according to the marketing channel, market segment, product grade, or quantity sold. Prices also fluctuate within and between seasons. Prices can even vary during one single day, like in many fresh vegetable markets. Surveys, therefore, should include questions related to prices in different markets, for different products, and during different seasons. When calculating average prices, prices should be weighted. An example of how to do this is provided in Box 5.

**Box 5: An example of calculating the weighted average selling price**

**Assume an example involving a consignment of 200 kg of cucumbers as follows ...**

100 kg sold at US$2.00 = US$200

40 kg sold at US$1.40 = US$56

40 kg sold at US$1.00 = US$40

10 kg sold at US$0.40 = US$4

10 kg which cannot be sold

Total Revenue = US$ 300

**The average selling price per kg is**

(US$2.00 + US$1.40 + US$1.00 + US$0.40 + US$0.00) ÷ 5 = US$0.96

**while the weighted average selling price is**

US$300 ÷ 200 kg = US$1.50



### Take Note

The price a producer receives for their crop may vary according to the volume they have for sale. For example, a trader looking to buy 1 ton of a commodity would be willing to pay a better price if they can purchase it all from a single farmer. They will pay less if they have to purchase 100 kg of the same quality from ten different farmers as the trader will incur more costs in collecting, as the trader will incur higher transaction costs.

When studying a market over several years, for example ten years, it is necessary to incorporate inflation and deflation rates. To do this, a base year against which all prices are adjusted, as well as an inflation rate, need to be chosen.

### Take Note

During interviews, many different cost and price units might be used. For example, handicrafts producers sometimes refer to their production volume in pieces, sometimes in tons, and sometimes in containers. This can be particularly confusing when the study is conducted by more than one person. It is important to either agree upon which unit of measurement is used, or to determine how many units fit into one container or tons.

## Step 4 Calculating financial performance measures

Several performance measures can now be calculated to describe and compare the financial position of different value chain actors and options.

### A. Net income

Net income, or profit, is calculated by deducting total variable and fixed costs from revenues.

**Net income = revenues – (variable costs + fixed costs)**

For example, if a rice miller sells 1,000 tons of milled rice (Q) per month for US$350 (P) per ton and has total costs of US$300,000 per month for paddy rice, labour, rent, depreciation on the machines, and tax, then the net income would be:

Net income = P * Q – X

(US$350 * 1,000) - US$300,000 = US$50,000 per month.

## Step 4
## Calculating financial performance measures

(Continued)

### B. Net margin

Net margin is the net income earned per unit of product. This is calculated by dividing the net income by the total volume of product sold (Q).

**Margin = Net income / Q**

In the case of the rice miller, the margin per product would be:

US$50,000 net income / 1,000 tons = US$50 per ton of milled rice

### C. Net profit margin

Net profit margin is the net margin per unit sale p rice and is usually expressed as a percentage. In this case,

**Net profit margin = Net Margin/Unit Price x 100**

For the rice miller: US$50/US$350 = 0.143 or 14.3% net profit margin.

### D. Cost of production

Cost of production is the total fixed and variable costs calculated per unit of output produced. Cost of production is an important performance measure of the technical cost efficiency of production. It is also independent of price received. This makes cost of production useful for quickly comparing production efficiency between actors, value chain products, and technology options. The difference between the product unit price and cost of production is the net margin.

**Cost of production = (variable costs + fixed costs)/total production**

For the rice miller: US$300,000/1,000 tons = US$300 per ton of milled rice

Highly efficient and profitable actors and value chain enterprises often have a low cost of production, meaning their total costs per unit of production are low. This is not necessarily achieved by simply reducing costs. In fact, cost of production can be reduced by investing in innovations and technologies that produce a significant boost to production output or efficiency relative to their cost. For example, increasing spending on improved, higher yielding seeds, and fertiliser may increase yields, whilst also reducing the cost of production, up to a point.

### E. Break-even point

The break-even point estimates how much an actor has to sell before they start making profit. In other words, the point at which their revenues are more than their costs.



**Break-even point = Total Fixed Costs / (P - Unit Variable Costs) = number of units**

For example, assume:

- Total fixed costs of the rice miller = US$125,000 per month
- 1 tons of milled rice is sold for US$350 (P)
- Variable costs per ton of milled rice = US$175

To calculate the break-even point:

US$125,000 / (US$350 - US$175) = 714.3 tons of milled rice per month

### F. Return on investment

Calculating the return on investment (ROI) for each actor in the value chain estimates how attractive the activity is relative to other potential uses of capital.

**ROI = (Net Income/Investment Cost) x 100**

For example, the rice millers' net income is calculated above as US$50,000 per month, which gives an annual net income of US$50,000 x 12 = US$600,000[6]. If the investment costs (the capital the rice miller spent to establish their business) were US$5,000,000, then the ROI would be:

(US$600,000/US$5,000,000) x 100 = 12% per annum on an annual basis.

Basic ROI calculations can be correctly performed only if, as in example A, a realistic depreciation of fixed assets is calculated, and if producers' own labour costs are counted among variable costs of production. If an enterprise's total capital costs are attributed to a single year's production, more capital-intensive activities will look much less profitable, while if "imputed" labour costs are omitted from the calculation of variable costs, ROI from labour-intensive activities will appear to be much higher.

6. Assuming constant revenues and costs over the year.

## Step 5
## Change over time

It is often not possible to collect the necessary data to enable a comprehensive comparison of costs and margins over time. However researchers can analyse how current trends or possible changes in input and product prices or even productivity levels might affect future profitability and competitiveness of enterprises in the value chain. What may look like profitable value chain activities today may become unprofitable in the future. For example, to date, Vietnamese traders who operate on a small scale have small margins on the products they sell. Over the past few years, the cost of petrol has increased significantly, causing a reduction in their margins. Analysing the possible impact of petrol price scenarios can help traders decide whether they need to increase the scale of their business, innovate to improve the operating cost efficiency or find another source of income.

## Step 6
## Relative financial position of actors in the value chain

In this step, the investments, costs, revenues, net income (or profit), and margins are compared among the actors in a value chain. The aim of this step is to analyse the relative performance and position of different value chain actors, including the distribution of costs and benefits.

There are several ways to present the financial position of actors in a value chain, for instance in a table or a diagram.

In Tables 4 and 5, an example of how to calculate the value-added margins and profits along a chain is given. Table 4 gives the formulas used to do the calculation, and Table 5 provides a worked example. The calculations are easily implemented in an Excel Worksheet.

**Tables 4 and 5**



**Table 4. Calculation of marketing prices – formulas for calculating ratios**

| Value Chain Actor | Costs | | | Price | Profits | | Margins | |
|---|---|---|---|---|---|---|---|---|
| | Total Unit Cost | Added Unit Cost* | % Added Cost | Unit Price | Profits | % Total Profits | Unit Margin | % Retail Price |
| **Farmers** | A | - | A/F | G | G-A | (G-A)/(K-F) | G | G/K |
| **Assemblers** | G+B | B | B/F | H | H-B-G | (H-B-G)/(K-F) | H-G | (H-G)/K |
| **Processors** | H+C | C | C/F | I | I-C-H | (I-C-H)/(K-F) | I-H | (I-H)/K |
| **Traders** | I+D | D | D/F | J | J-D-I | (J-D-I)/(K-F) | J-I | (J-I)/K |
| **Retailers** | J+E | E | E/F | K | K-E-J | (K-E-J)/(K-F) | K-J | (K-J)/K |
| **Total** | | F= A+B+C+D+E | 100 | | K-F | 100 | K | 100 |

*Added unit costs refer to the **added** costs at each stage of production net of the procurement cost from the previous stage.

**Table 5. Calculation of marketing margins (VND) - example of presenting a calculation of value chain margins**

| Value Chain Actor | Costs | | | Price | Profits | | Margins | |
|---|---|---|---|---|---|---|---|---|
| | Unit Total Cost | Added Unit Cost* | % Added Cost | Unit Price | Unit Profits | % Total Profits | Unit Margin | % Retail Price |
| **Farmers** | 20,000 | 20,000 | 29% | 25,000 | 5,000 | 9% | 25,000 | 20% |
| **Assemblers** | 32,100 | 7,100 | 10% | 37,500 | 5,400 | 10% | 12,500 | 10% |
| **Traders** | 39,185 | 1,685 | 2% | 50,000 | 10,815 | 19% | 12,500 | 10% |
| **Processors/ Retailers** | 89,873 | 39,873 | 58% | 125,000 | 35,127 | 62% | 75,000 | 60% |
| **Total** | | 68,658 | 100% | | 56,342 | 100% | 125,000 | 100% |

The diagrammatic presentation of the value chain margins is shown in the Figure 1 below.

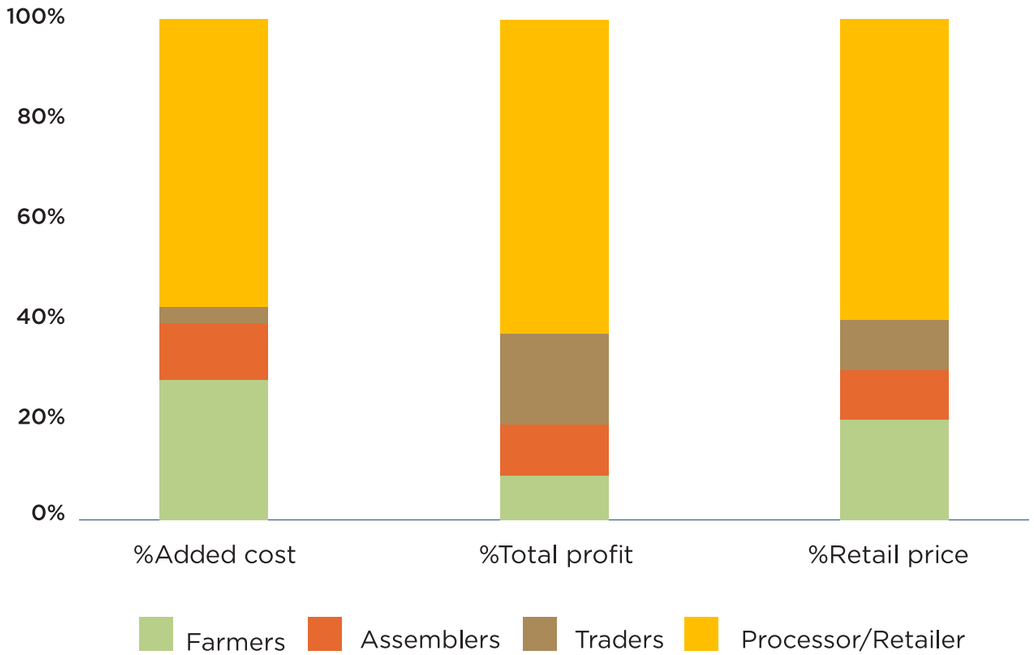



Figure 1. Value chain margins for the actors in each level of the value chain as a percentage of the overall value added

After data has been presented, a researcher can start the analysis. In Figure 1, for example, it may be evident that farmers have high costs and small profits, whereas traders have small costs and relatively high profits. This might suggest that costs and margins may be shared unequally in the value chain – but this may be very misleading. In this analysis, the researcher needs to carefully consider total costs, revenues, and profits per actor.

Presenting the total costs, revenues, and profits per actor per year (instead of simply presenting cost per unit) shows the scale of an actor's business. This is important because, if only the profit per unit is considered, an actor might appear to have an unfair share as they make only a small profit per unit.

However, looking at the actor's total profit per year may demonstrate that the actor actually earns a reasonable income. This is often the case with commodity products, such as maize. Commodities often have low profit margins per unit, but because they are sold in large quantities, the total profit per year can still be financially attractive.



## Step 7
## Benchmarking

Comparing key productivity and financial performance measures of the same category of actors within a community, or between communities, regions, or countries can provide useful information about the potential for efficiency gains. Value chain interventions often require farmers to intensify their management practices (i.e. spend more on technology, labour or other inputs) to increase efficiency, yields, product quality, and profits. Therefore it is important that benchmarking examines a range of key productivity, quality and profitability measures and not just simple measures such as input costs or yields. For instance, rice farmers in northern Vietnam may spend VND1,000,000/ha on inputs, while their counterparts in the central highlands only spend VND500,000/ha. This may mean northern farmers are using too many inputs and are less efficient. Alternatively the price of inputs may be much higher due to additional transport costs. However it is possible northern farmers are actually producing much higher yields and better quality. This may mean they may have similar or lower costs of production (i.e. higher yields per unit cost) and receive higher prices, which actually makes them more profitable than farmers in the central highlands. Detailed benchmarking analysis can understand what is really going on

In addition, it is useful to compare the financial performance of different groups or categories of actors within the value chain. This can help to identify which categories are more efficient and profitable. Given a comprehensive set of financial metrics for each category of actor, it should be possible to drill deeper into the causes of differences in efficiency and profitability.

## Step 8
## Going beyond the quantitative data

The final step is to go beyond the quantitative data and explore why certain actors in the chain are more efficient and profitable than others. Is this the result of one actor investing more than another, having better technical knowledge, or enjoying greater access to market information because of better linkages? Is it the result of unequal power distribution between actors?

Differences in the margins and profits earned between actors in different categories can reflect different issues: large scale activities may allow for lower margins; higher risk levels are usually associated with higher margins; the ability to develop a brand can result in higher margins; or a stronger bargaining position can lead to the same outcome. Levels of investment, or market linkages and access to market information, or technical know-how are more important when comparing margins within the same category of actor.

## What Should Be Known after Analysis is Complete

Having followed all of the steps related to costs and margins the financial situation of actors involved in the value chain should be clear, and strengths and weaknesses related to costs and margins of an actor and/or a value chain can be summarised. After that, the constraints and needs of a value chain can be identified, and interventions can be designed.

Thousands of farming households still rely on rice for food security and income. Planting rice seedlings, Yen Bai, northern Vietnam.
Photo: ©2014CIAT/GeorginaSmith

# Tool 6
# Income Distribution

# Introduction

In the previous chapter, Tool 5 provided steps to analyse revenue, costs, and margins for chain actors. This chapter extends these analyses by looking at income generation and distribution at different levels and dimensions in the value chain.

Income, generated from profits or wages, is always important for household livelihoods and for agri-businesses. Increasing income is a top priority for poor households and value chain actors. It is also often a focus of government policy and development interventions – especially in the common situation where there is uneven income distribution between groups of actors, process levels of the chain, and market segments.

Low and unreliable incomes are a debilitating reality for the poor and disadvantaged. Incomes are often also lower for ethnic groups and women compared to their counterparts. Analysing incomes and distribution can help identify where income is generated amongst different actor groups, process levels, and market segments in the value chain. Analyses can identify where the poor, women, or disadvantaged groups can participate and derive more benefit, or where there are opportunities for income generation.

An analysis of incomes acknowledges that individual actors can participate in different value chains at the same time. For example, a farming household may earn income from several agricultural crop enterprises, various handicraft activities, as well as off-farm employment. A trader might also be involved in trading multiple agricultural products at the same time, or at different times of the year, depending on the season. Therefore, analysis should recognise that income from multiple sources contribute to an individual's or family's overall net income and livelihood strategy.



Generating sufficient income is a major challenge for many rural households. Cher Thai Lor and his family, Xiang Khouang Province, Laos. Photo: ©2014CIAT/GeorginaSmith

Plums provide important income in the mountainous areas of northern Vietnam. Sorting and packing plums in Son La province for urban markets. Photo: FocusGroupGo/Rodd Dyer

# Objectives

The objective of income distribution analysis is to:

- Calculate and benchmark incomes for actors at each process level
- Calculate income variability over time
- Compare incomes across different market segments
- Calculate sector level income and wages

## Terminology

**Net income**, refers to the revenue received from the sale of goods and services or an individual's labour, plus the value of self-consumed output minus costs. This is the profit of a value chain enterprise or company.

**Gross income** is the revenue generated from sales or an individual's labour.

The calculation of net income **does not** deduct the cost of own labour, since this accrues to the enterprise as "income" from labour. However, the cost of hired labour is deducted, as this is a cost to the enterprise.

Where a barter system occurs, cash income can be distinguished from non-cash income. For example, hired labour is sometimes paid for in a combination of cash and benefits (food, healthcare, pension).

Many women are employed in packing, processing, and distribution businesses, such as this mango packhouse in southern China.
Photo: Oikoi



# Steps

## Step 1
## Define actors and categories

To analyse incomes within value chains, it is useful to group actors into meaningful categories. Mapping (Tool 2) provides examples of different ways actors can be categorised. Comparing income between poor and non-poor households, or different enterprise production scales, can be useful. Similarly, there are often large income differences between men and women or different ethnic groups that need considering.

## Take Note

Poverty levels are a relative measure and it is difficult (and perhaps unwise) to compare poverty (as defined by income) between households at different levels of the value chain with different costs of living. For example, a poor farming household earning US$1 per day cannot be compared against a poor factory worker in the city earning US$4 per day. Both are poor relative to other actors; however, there is clearly a difference between an income of US$1 and US$4 per day.

Other measures of income (such as purchasing power) may be a better reflection of differences between different levels of the value chain. Official poverty lines can also be used, which are often different between urban and rural areas, or between mountainous rural areas and flat land agricultural areas.

Traditional fruit and vegetable retail outlets like this one in Indonesia, provide income for thousands of small business owners.
Photo: Oikoi

## Step 2
## Calculating the income at each process level of the value chain

Comparing the net income at each process level of the value chain provides a picture of how financial benefits are distributed between actors and groups. It also reflects the vastly different product volumes that are often handled by actors at each level.

Total net income is calculated as total revenue minus total costs (where total costs include hired labour costs but **do not include own labour costs**). Net income per unit is calculated by dividing total net income by product volume sold and consumed. In the example in Table 1, the net income and sales volume are used to calculate income earned by each actor at each process level in the value chain.

Collecting accurate data to estimate income, especially cost data, can be challenging. It also needs to account for the transformation of the product into different forms as it moves throughout the chain.

**Table 1. Example of income distribution along the value chain for silk in Thailand**

| | Cocoon - farmer | Yarn - farmer | Cocoon and yarn farmer | Trader | Weaver | Small retailer |
|---|---|---|---|---|---|---|
| **Total costs per unit (Baht)** | 67 | 725 | 704 | 715 | 437 | 744 |
| **Total revenue per unit (Baht)** | 70 | 834 | 834 | 750 | 660 | 812 |
| **Net income per unit (Baht)** | 3 | 109 | 130 | 35 | 223 | 68 |
| **Sales volume per month** | 137 kg | 18 kg | 18 kg | 18 kg | 100 pieces | 100 pieces |
| **Total income per month (Baht)** | 411 | 1,962 | 2,340 | 630 | 22,266 | 6,822 |



The analysis of incomes at each process level of the value chain can also be enhanced by disaggregating the analysis to the sub-groups of actors defined in Step 1. For example, the incomes of poor, average, and better-off farmers can be analysed separately, rather than being considered as one homogenous group of “farmers”. With given information about the costs, revenues, and sales quantities of each group, the levels of net and total income for different categories can easily be calculated.

## Step 3
## Benchmarking incomes at each process level of the value chain

The average net income estimated for actors at each level of the chain can be benchmarked and compared to official poverty line estimates (i.e. the minimum income deemed adequate), or a subsistence level of expenditure.

Using the benchmark level of poverty, and the profit margin and income information from a value chain enterprise, a calculation can be made to determine the production levels and prices that are required to generate income higher than the poverty line. Examples could include the rice area and yield, or tons of fruit traded.

Comparing expected income with subsistence living expenses is another way to evaluate whether participating in the value chain is an effective livelihood strategy. For example, in the example in Figure 1, net incomes from the production of rice in the Red River Delta of Vietnam were calculated according to land area, and compared against the official poverty line. The example shows that at least 0.57 ha of paddy is needed for household net income from rice production to exceed the poverty threshold. Given the allocation of land per household usually is around 0.144 ha (360m2 per person and up to four people per household), the analysis implies that unless yields can be dramatically increased, rice production alone will have little impact on alleviating poverty. Therefore, alternative higher-income generating activities and value chains need to be considered.

Figure 1 →

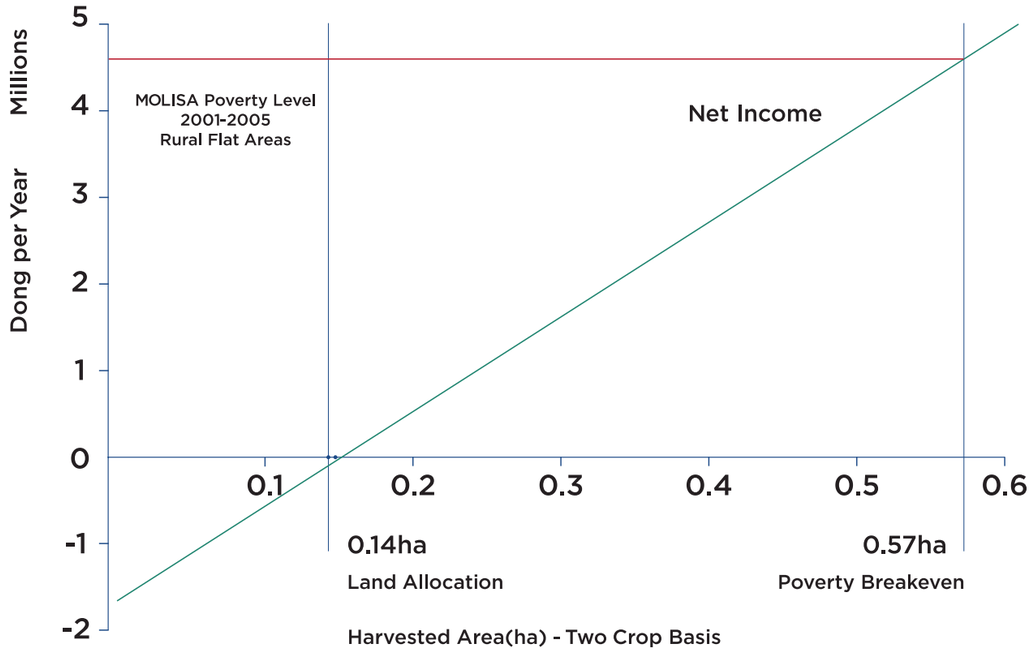



Figure 1. Comparison of net incomes from rice production with the official poverty line – Minimum area of rice land required to support a four-person household in the Red River Delta of Vietnam. Source: Adapted from[1]

## Step 4
## Calculate income variability over time

Seasonality of income is important, as substantial variations can occur. Value chain investigations based on a single estimate of income, at one point in time, may result in biased estimates. Therefore, analyses should consider the seasonal variation of income and expenses throughout the year.

Highly seasonal income adversely affects the poor, smallholder farmers and agribusinesses. It constrains cash flow, increases production risks, and limits actors' ability to invest in activities. Households who rely on revenue from crops such rice or maize, or fruit trees such as plums, may only generate income during one or two narrow harvest windows throughout the year. However, product prices can also vary a lot during the year, peaking during festive periods such as Ramadan and Lunar New Year, but commonly plunging during peak supply periods.

1. ADB, *Adding Value to Viet Nam's Rice Industry and Improving the Incomes of the Poor*, Central Institute for Economic Management, Asian Development Bank, International Finance Corporation and Mekong Private Sector Development Facility, Hanoi, 2004.



Similarly, raw material supply for fruit processors, for example, may also be highly seasonal, which creates a range of technical, operating, and cash flow challenges associated with profitably operating large capital investments.

For smallholder farming households, cash may be most constrained in the period just prior to harvest. After a large harvest, households may have enough cash for their needs before planting begins and inputs need to be purchased.

There may also be significant differences between the cash constraint profiles of female- and male-headed households or poor, average, and better-off households. Poorer households are more likely to suffer severe financial distress during months when there is no or little income from crop sales. During these periods, there may be insufficient cash to purchase food or meet other basic needs, let alone inputs for next years' crop. Periods when school fees or other large expenses need to be paid can also be difficult.

Box 1 below gives an example of a simple survey instrument designed to determine seasonal levels of cash constraint.

**Box 1: Example of survey question to examine seasonal cash constraints**

What are the seasonal cash constraints for the farmers? Get the farmer to place a ☑ or a ☒ in the appropriate row for each month.

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Surplus cash** | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| **Enough cash** | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| **Lack of cash** | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

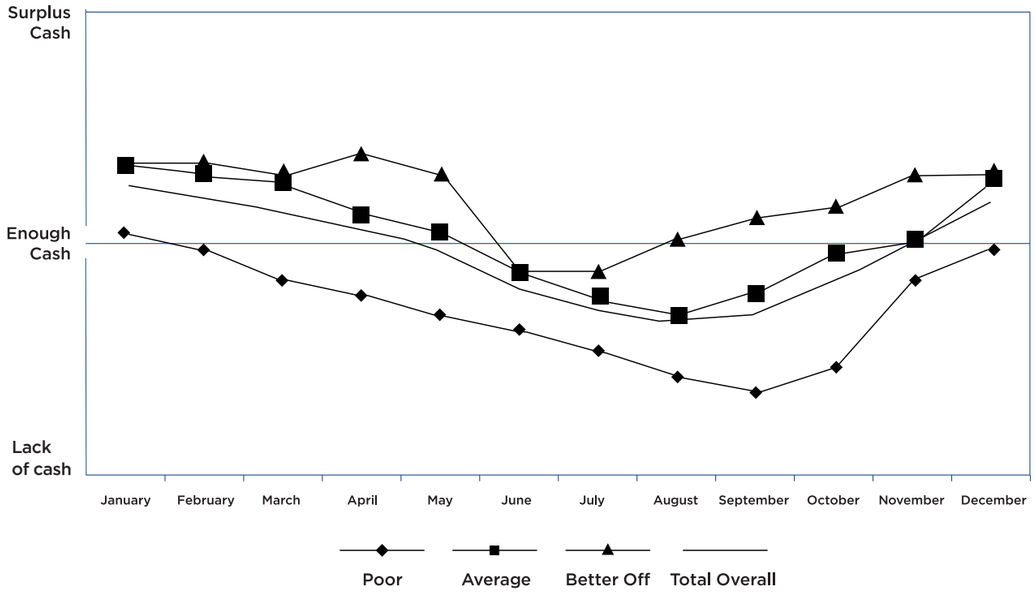



Figure 2. Monthly cash constraint by wealth category. Source[2]

A household's or business' debt situation may not be immediately obvious. However, it is important to understand something about household debt when analysing seasonal income variability and identifying appropriate value chain options and solutions. Many households and businesses may purchase inputs on credit and carry debts with multiple formal sources (e.g. banks and credit unions) and informal sources (e.g. money lenders or traders).

Debt and credit repayments can severely reduce the net proceeds and cash available from product sales for the remainder of the year. This is particularly the case for poorer or disadvantaged groups, whose income is low to start with. For example, it is not unusual for ethnic minority maize farmers in the northern mountainous areas of Vietnam to borrow money from local money lenders to buy food and basic expenses to survive several months of the year until the income from the next harvest is received. Price or yield shocks can be devastating to these farmers and lead to a cycle of indebtedness.

In order to delve deeper into debt and credit repayments throughout the year, it would be necessary to utilise a simple monthly cashflow calculator. An example is shown in Table 2.

2. NERI, *Macroeconomics of Poverty Reduction Project - Improving Farm Family Incomes in Lao PDR. Vientiane, Lao PDR*, Prepared for the UNDP and the National Economic Research Institute of Lao PDR, United Nations Development Programme and National Economic Research Institute (NERI), 2005.



**Table 2. Sample monthly cashflow calculator**

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Revenue** | | | | | | | | | | | | | |
| Harvest sales | $485 | | | | | | $525 | | | | | | |
| Livestock sales | | | | | | | | | | | | $218 | |
| **Total revenue** | **$485** | **0** | **0** | **0** | **0** | **0** | **$525** | **0** | **0** | **0** | **0** | **$218** | **$1,228** |
| **Expense** | | | | | | | | | | | | | |
| Inputs | | | $44 | | | | | | $35 | | | | |
| Labour | $36 | | $15 | | | | $44 | | $29 | | $15 | | |
| Plowing | | | $44 | | | | | | $44 | | | | |
| Transport | $29 | | | | | | $29 | | | | | | |
| Farm loan repayment | $15 | $15 | $15 | $15 | $15 | $15 | $15 | $15 | $15 | $15 | $15 | $15 | |
| **Total expense** | **$80** | **$15** | **$118** | **$15** | **$15** | **$15** | **$88** | **$15** | **$123** | **$15** | **$30** | **$15** | **$544** |
| **Net income** | **$405** | **-$15** | **-$118** | **-$15** | **-$15** | **-$15** | **$437** | **-$15** | **-$123** | **-$15** | **-$30** | **$203** | **$684** |

Source[3]

This approach can be applied to compare seasonal cash flow and constraints between different value chains or different income or target groups. This disaggregated analysis can also be undertaken utilising any of the categorisations outlined in Step 1 – for example, seasonal cash flow levels for female- and male-headed households, or for households of different ethnicities.

## Step 5
## Contribution to total income and livelihoods

It is important to consider the contribution of income from different value chain enterprises or activities to the total household or business income. As families attempt to diversify their income, one value chain may contribute only a small proportion of total income. Alternatively, households may rely almost completely on income from one value chain product or enterprise.

A study of street vendors in Hanoi found their business represented more than 90% of cash income of the household. Productivity and income improvements in this activity will therefore have significant impact on total family incomes.

Where income is dominated by low-value crops such as rice or maize, households are often better off diverting (diversifying) some of their land, labour, or capital into higher value crops and leaving or reducing their involvement in value chains with lower potential incomes. This assumes that food security of the family will not be threatened by reducing the area of their staple food crop.

3. USAID and Mercy Corps, *Program Farming for a Profit: Technical Guidance for Smallholder Farmer Financial Planning*, The Technical and Operational Performance Support (TOPS), 2017, https://www.fsnnetwork.org/sites/default/files/techguide-financialplanningguide-interactive-final_508.pdf

The contribution of income from different activities to household livelihoods can be determined using a survey questionnaire. It is important to distinguish between activities that derive income through cash sales, and those that are carried out for household consumption purposes.

The survey results can be analysed for different household categories. The example in the table below shows the different income and livelihood sources of cassava farmers in Dak Lak, Vietnam categorised by income quartile[4].

**Table 3. Average farm household incomes from different sources (USD/year) by income quartile (2016)**

| Income quartile | Q1 | Q2 | Q3 | Q4 | All households |
|---|---|---|---|---|---|
| Total cassava income | 435 | 836 | 988 | 1708 | 991 |
| Paddy rice production value | 125 | 302 | 469 | 554 | 362 |
| Income from maize | 17 | 35 | 34 | 23 | 27 |
| Income from all other annual crops | 10 | 54 | 133 | 3566 | 937 |
| Income from coffee | 30 | 144 | 853 | 1960 | 744 |
| Income from all other tree crops | 7 | 35 | 47 | 261 | 87 |
| **Cropping income** | 625 | 1405 | 2524 | 8071 | 3149 |
| **Non-cassava cropping income** | 190 | 569 | 1536 | 6363 | 2158 |
| **Total livestock and fish income** | 21 | 147 | 347 | 1192 | 426 |
| **On-farm income** | 646 | 1551 | 2871 | 9264 | 3575 |
| Off-farm wages | 286 | 467 | 740 | 605 | 524 |
| Irregular non-farm income | 4 | 28 | 162 | 294 | 122 |
| Salary income | 12 | 28 | 86 | 718 | 210 |
| NTFP income | 4 | 6 | 0 | 0 | 3 |
| Fishing income | 0 | 0 | 0 | 0 | 0 |
| Other income | 6 | 55 | 108 | 358 | 131 |
| **Off-farm income** | 312 | 585 | 1096 | 1975 | 991 |
| **Total income** | 958 | 2137 | 3968 | 11239 | 4566 |

4. V.N. Nguyen et al., *Value Chain Analysis, Household Survey and Agronomic Trial Results in Dak Lak, Vietnam*, Cassava Program Discussion Papers Number 2, University of Queensland, 2018.



The analysis should distinguish between overall livelihood sources and cash income sources. In the table above, paddy rice is a staple crop grown by households for their own consumption. When calculating overall livelihood sources, the own production value of staple crops should be included. Converting the figures to percentages and presenting them as 100 percent stacked bar charts is a convenient way of comparing sources of livelihood across categories (Figure 3).

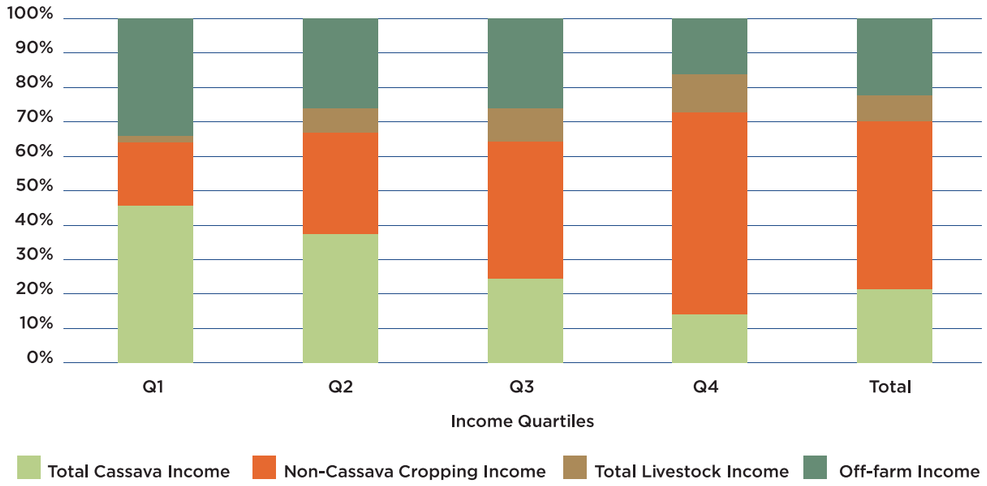



Figure 3. Livelihood sources of cassava farmers in Dak Lak (2016), by income qarticle (Q)

Figure 4 shows the sources of cash income by income quartile. This is derived by not including the value of paddy rice in the calculation of gross income. Cassava's relative importance to lower income households is shown clearly, with cassava providing, on average, more than half of the cash income of households in the lowest income quartile, and an average of more than 40 percent of the income of households in the second income quartile.

Figure 4

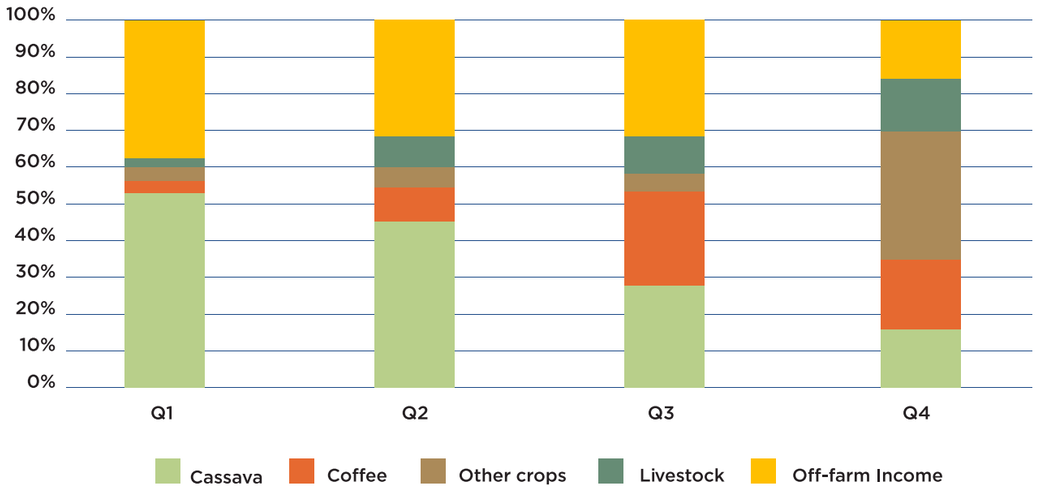



Figure 4. Cash income sources of cassava farmers in Dak Lak (2016), by income quartile (Q)

Traders are also likely to have multiple income sources. One trader may be involved in different agricultural value chains, either simultaneously or on a seasonal basis. This means that decisions to participate in any particular value chain are contingent on factors which could be outside the value chain. For example, a trader may liquidate maize stocks at a loss rather than wait for an imminent price rise, if they need to use the storage space and cash liquidity to engage in the upcoming soybean season.

## Step 6
## Comparing incomes across different market channels

A researcher may wish to compare incomes between different market segments within a value chain, between different governance structures, or between commodities (value chains) in a particular area. It is important to recognise that comparing different value chains in different areas without considering the different agro-ecological systems (for production), or the different technologies available (low-technology milling versus high-technology milling), may result in incorrect conclusions. Different marketing channels often have different product price settings, which also impact on production systems, inputs, and costs.

The following example (Figure 5) compares net incomes for producers and processors across three different market channels with distinct governance systems within the cotton value chain in Zambia. The distributor system adopts a principal-agent model where the processor makes contracts with traders, who are then



responsible for the distribution of inputs and delivery of services to farmers, and the collection of the crop. In the contract farmer system, the processing company employs teams of field agents and extension advisors to service contracted farmers. In the side-buyer system the processor does not invest in providing inputs or services to farmers, but relies on farmers who are engaged in the two other systems to renege on their contracts by offering a slightly higher price.

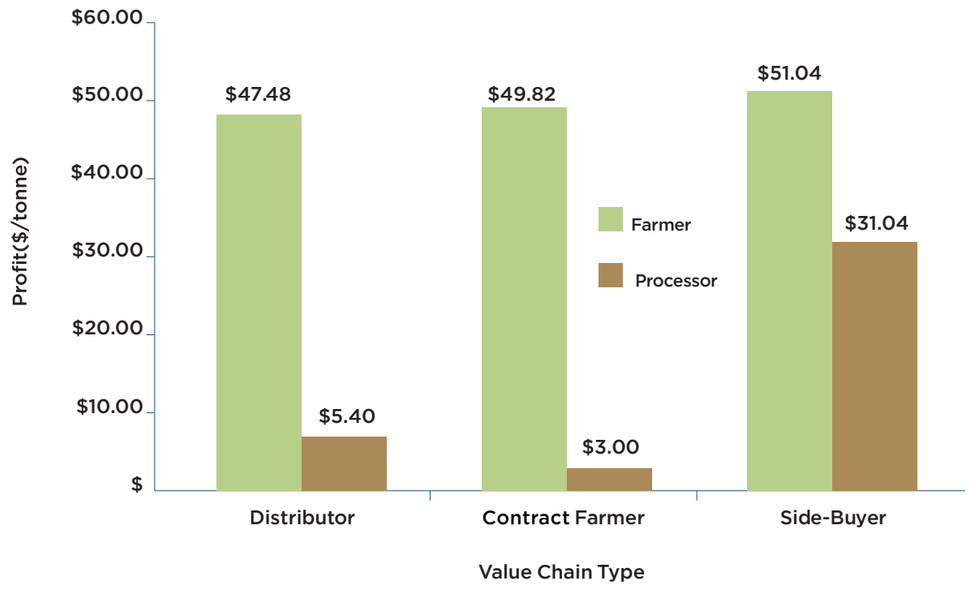



Figure 5. Comparison of profit margins across market channel with different governance systems in the cotton value chain in Zambia. Source[5]

The analysis shows that farmers are better off in the side-buyer market channels as the profits are slightly higher than in the other two channels. However, such a strategy may not be sustainable in the long run, as it could force the other governance systems out of the market and farmers would lose the advantages of having their inputs and services provided by the lead firms.

The analysis also shows that while the side-buyer processor has the greatest profit (since they do not have to spend any money on inputs or extension), the distributor model is more profitable than the contract farmer model. This is because the contract farmer processor has to spend their own money on the logistics of

5. T. Purcell et al., *Zambia Participatory Value Chain Management for Poverty Reduction*, Report Prepared for the World Bank, Lusaka, 2008.

providing inputs and services, as well as collection of the harvest.

Undertaking an ex-ante analysis of incomes in value chains before and after moving between market channels with different governance systems is obviously not possible. However, it is generally feasible to undertake a "with" and "without" analysis for actors at the same time. This will still enable an estimate of the economic impact of value chain upgrading to be made.

## Step 7
## Estimating sector level income and wages

Steps 1-6 have involved analysing incomes at the level of individual actors within different process levels of the value chain. This step takes the income analysis further by aggregating income and wage information to a sectoral level. This enables comparisons of the impacts of different value chains on the economy as a whole.

Within a single value chain, it is important to separate out the income at each process level into profits for the value chain actor, and the wages paid to employees or hired personnel. Together, both of these represent an overall income.

The example in Table 4 looks at the distribution of wages and profits at different process steps in the cotton value chain in Zambia. Looking at profits along the chain, it would suggest that farmers earn US$15.9 million and processors earn US$0.99 million. When wages are taken into consideration, it shows that the processing industry contributes US$9.6 million to the Zambian economy in hired labour alone, while the farm level contributes US$7.3 million.

**Table 4. Distribution of incomes and profits in the Zambian cotton value chain**

| Wage Costs/Profits | $/ton | ton/actor | No. Actors | Total ($) |
|---|---|---|---|---|
| **Farmer** | | | | |
| **Wage Costs** | $40.00 | 0.655 | 280,000 | 7,336,000 |
| **Profit** | $86.75 | 0.655 | 280,000 | 15,910,000 |
| | | | | |
| **Processor** | | | | |
| **Wage Costs** | $52.20 | 30,566 | 6 | 9,573,000 |
| **Profit** | $5.40 | 30,566 | 6 | 990,000 |
| | | | | |
| **Total Wages** | | | | 16,909,000 |
| **Total Profit** | | | | 16,900,000 |

Source[5]



In the example in Figure 6, the analysis in Table 4 for the cotton value chain has been expanded to compare income, profit and totals for farmers and processors in three different value chains in Zambia (cotton, tobacco, and sugar).

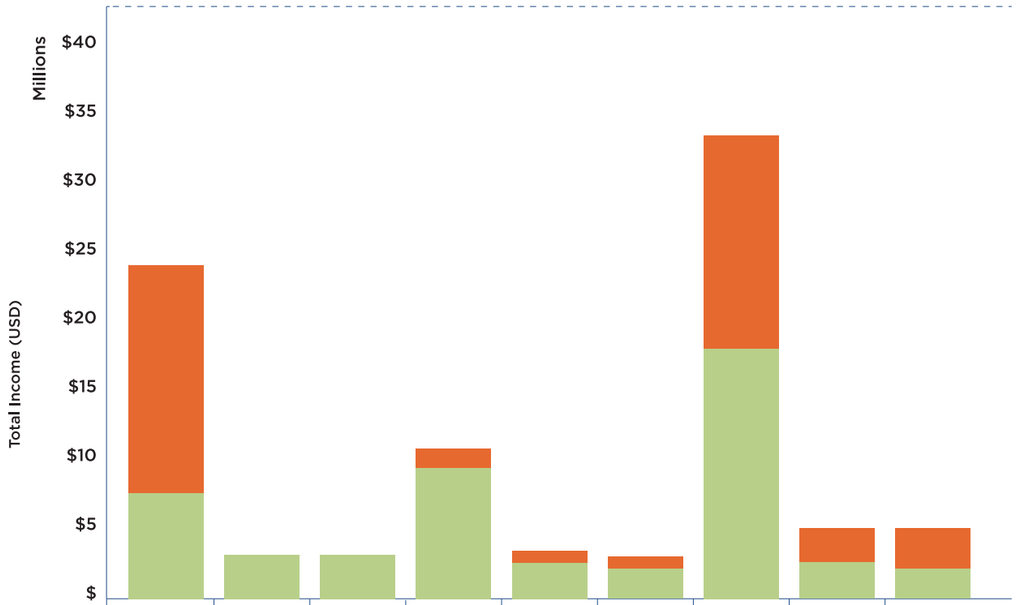



Figure 6. Income distribution and employment across value chains in Zambia

## What Should be Known after Analysis is Complete

After having followed all the steps, it should be possible to answer the key questions outlined below:

- Are there differences in incomes within and between different levels of the value chain?
- What is the impact of various market channels and governance systems on income distribution between and within various levels of the value chain?
- What are the changes in incomes that result from the development of various types of value chains?

Community vegetable production in the mountains of South Cotabato, in the southern Philippines, Mindanao. Photo: ACIAR/Jeoffrey Maitem


Street peddlers generating income from selling fruit and vegetables in Hanoi, Vietnam.
Photo: ©2015CIAT/GeorginaSmith

# Tool 7
# Employment Distribution

# Introduction

Tool 6 provided guidelines to analyse the distribution of income between value chain actors, and to identify areas where income for the poor, women and other target groups could be increased. This chapter provides steps to analyse the amount and distribution of employment available in the value chain, across different process levels, market channels and actor groups.

Farms and agricultural value chains provide a critical source of employment and income for millions of men and women in developing countries. While most farmers still predominately work on their own farms, increasingly they also provide labour for other farms or work in other sectors. Off-farm employment can be permanent, seasonal or casual, skilled or unskilled.

The amount and type of employment available in different value chains influences the potential economic and social impacts. In particular, the ability to provide work for the poor, or for women and other disadvantaged groups, is a key consideration for developing inclusive value chains. The potential for employment, and how income is distributed between actors, will also be influenced by the balance between labour-intensive or capital-intensive development processes occuring in the value chain.

The tools in this section aims to address some key questions about employment in value chains: How many people are employed directly and indirectly? Who is employed? Where in the chain are they engaged? What types of employment and jobs exist? Where are women and men, the young and old, or other groups employed? What employment barriers and opportunities exist for these groups between or within different value chains or market channels? What is the impact of technology adoption or chain upgrading on employment? What seasonal or temporal factors affect employment?

**Box 1: A useful definition of employment**

Employment refers to when people are engaged in any activity to produce goods or provide services for pay or profit. It includes renumeration in the form of **wages or salaries for time worked, or for work done, or profits generated from the goods and services produced for sale or barter**. Renumeration can be payable in cash or in-kind.

Employment includes the work men and women do on their own farms, including trading and processing activities as well as the paid wage labour provided by farms and agribusiness in the value chain. Employment may also include intermittent unpaid work (e.g. corvee labour) where men and women provide and share their labour for local projects such as road construction or harvesting.

Source: Adapted from[1]

1. E.M. Benes and K. Walsh, *Measuring employment in labour force surveys: Main findings from the ILO LFS pilot studies*, International Labour Organization, July 2018, https://www.ilo.org/wcmsp5/groups/public/---dgreports/---stat/documents/publication/wcms_635732.pdf

Women employed in the cassava starch processing factory in Quang Binh, Vietnam
Photo: ©2015CIAT/GeorginaSmith

Patterns of labour and employment in agricultural value chains are changing. The proportion of people employed in agriculture compared to manufacturing and service sectors declines as economies develop and transform. Urban migration (permanent and seasonal), ageing workforces and increasing reliance on women influence the available supply, composition and cost of agricultural labour and employment. On the other hand, structural adjustment processes, increasing production scales, and mechanisation and new technologies can reduce local labour requirements. This may occur throughout the entire chain, or within certain segments.

In many rural areas, seasonal patterns of labour use are highly gendered, as men and women have different opportunities for off-farm and on-farm paid labour work at different times of year. The opportunities vary not only with demands for men or women employment but also according to gender norms in the community.

Furthermore, there are significant generation gaps of younger people participating in farming. Young women and men are increasingly absent from their villages. Household farming strategies are shaped by available male and female labour resources, and therefore, it is important to understand gender dimensions of labour use patterns.

The following key questions should be considered when analysing labour use with a gender lens:

- Who within the household participates more in seasonal paid work; young unmarried men, young unmarried women, married men or married women?
- What kinds of employment opportunities do young women and men have in the community?
- What are the employment opportunities along the chain?

## Objectives

The analysis of employment in the value chain aims to:

1. Determine the type, amount and distribution of employment for different actor groups between process levels;
2. Understand impact of different market channels, governance systems and technology on employment distribution;
3. Understand employment variability over time for different value chain processes and market channels.

Harvesting cassava provides employment near Khorat, Thailand.
Photo: 2009CIAT/NeilPalmer

# Steps

## Step 1
## Define the categories of actors

As with other tools, the first step, is to categorise actors into meaningful groups for analysis. Categories should reflect the different types of farmers, collectors, wholesalers, and retailers employed in the chain, including indirect actors.

A pro-poor or inclusive focus should especially include categories and indicators for income, poverty status, gender, age, or ethnicity. It is important that these categories (e.g. low, medium, and high-income households) can be clearly defined, identified, and sampled to enable meaningful disaggregated analysis.

The Mapping Tool (Tool 2) provides examples which can be used as a starting point. Categories used for employment are likely to be similar to those used in other Tools, (e.g. income Analysis - Tool 6).

## Step 2
## Determine employment at each process step

This step involves collecting data and information about the numbers of full-time and part-time staff and hired workers employed by firms or other organisations at each process step of the value chain. It should also include the work that both women and men do on their own farms, farm, processing and trading (e.g. input dealers, collectors, wholesalers, retailers, etc) businesses. This information can be aggregated to estimate the total amount of employment at each process step.

A detailed picture of employment can be determined by conducting surveys and field interviews with the with chain participants at each process level. The following estimation techniques can be used at different process levels:

**A. Wholesalers:** Wholesalers can generally be surveyed quite rapidly. Be aware that the number of wholesalers in the off-season may be much smaller than in the main season.

**B. Retailers:** The number of retailers can be estimated from information about the total traded volume of a product in a value chain, and from the daily retailer turnover. The number of traders or stallholders in wet markets or agricultural markets in a given area can also be estimated.



## Standardised measures of employment

As many actors in agricultural value chain are only involved seasonally, it could be useful to convert the collected employment data into a standardised measure. This allows comparisons among various value chains; for example, using the number of full-time equivalent (FTE) as the main indicator for the employment created by a certain value chain. One simply defines or agrees on how much labour days per year are considered 1 FTE, for example 240 days. If someone only works for 120 days, this is accounted as a half FTE. It is also important to consider both direct and indirect employment – in administration and ancillary services. In another example, farmers can hire labour to work on lower-valued crops while they concentrate their own labour on higher-valued crops.

**Example calculation of retailer numbers**

If there is time, all retailers in a sample area can be counted (e.g. wet market retailers) and used to estimate the total number of retailers in a wider area. For example, count the total number of markets in a city (e.g. 130) and then take a random sample of various markets (e.g. 15). Visit these markets and count the number of retailers in these markets, or ask the market administrator (if present) how many booths he rents out. Calculate the average number of retailers per market and multiply by 130 to get a rough estimate.

Systematic searches of internet mapping apps (e.g. Google Maps) can be used to estimate the number of modern retail outlets such as supermarkets, mini-marts, and specialty shops in a defined sample area.

**C. Transporters:** Estimate the total volume of sales, and the typical volume per transport unit (e.g. trucks, motorbike, carts, boats). Then estimate the number of people required per transport unit, the time required to transport, and the number of full-time equivalent employees (FTEs) this generates.

**D. Processors:** Identify the number of processors in an area from official sources (e.g. registration certificates); identify the number of informal processors from key informant interviews.

**E. Collectors:** Conduct interviews with village leaders or commune heads. Estimate the number of collectors under each trader/ wholesaler. Estimate the total volume of sales, and the typical volume per transport unit. Then estimate the number of people required per transport unit, the time required to transport, and the number of FTEs this generates.

**F. Farmers:** The number of farmers can be estimated from local estimates or statistics reporting average yields, areas, and production volumes. Agricultural census data or local statistics collected by district authorities can also be useful. Obtain information on sales of key inputs sold by input providers at bottleneck points (e.g. seed). Be sure to distinguish between smallholders and commercial farmers.

**G. Hired labour at farm level:** Estimate typical hired labour use for different crops from household level surveys or focus-group discussions, and scale up.

**H. Input suppliers:** Estimate the number of small retail shops and kiosks selling seeds, fertiliser, chemicals and farm equipment as well as nurseries and breeders. Estimate volumes demanded in the market and volumes provided by the average input supplier. Estimate average employment per input supplier and estimate the total number of FTEs this generates.

**I. Service suppliers:** Estimate the typical number of people providing various services such as extension, finance, marketing and transport in a village or given area. Estimate how much of the services provided by the suppliers feed into the specific chain.

Box 2 gives an example of the type of information it is possible to collect about employment at different process levels of the value chain and the types of initial analysis that can be made utilising this data.



**Box 2: Example of employment at different process levels of a value chain**

Within the framework of the GTZ Value Chain development program in Vietnam, an avocado value chain analysis was carried out in Dak Lak Province. At the time, avocado trees were mostly grown as shade trees or windbreakers around coffee fields and were not a foremost priority for policymakers.

On average, a farmer has about five avocado trees, which might suggest that avocado is not an important product in Dak Lak. Based on data collected during a rapid diagnostic appraisal and a short survey among the 98 major avocado wholesalers in Dak Lak province, it was possible to calculate the number of persons involved in the avocado sector. This example only makes estimates of the avocado sector in Dak Lak and does not include all the employment involved of wholesalers and retailers in Ho Chi Minh City, Hanoi, and all other cities to which the avocados are transported.

Based on the census, it was estimated that during the main avocado season, 337 ton of avocados per day are exported from Dak Lak to other provinces in Vietnam. This figure was obtained through very brief interviews (max 20 min per wholesaler) with almost all avocado wholesalers in Dak Lak province. These 337 ton per day are only exported during the main season, which lasts four months. Avocado is also traded during the other eight months of the year, but in very small volumes. Employment analysis was focused on the main season only, so the data presented below are an underestimation of the employment generated by the sector.

| Sector size in Dak Lak | | |
|---|---|---|
| **Avocados exported by Dak Lak wholesalers** | 337 ton/day | 40,410 ton/season |
| **Harvested number of trees** | 3,368 trees/day | 404,100 trees/season |
| **Number of farmers involved** | 674 farmers/day | 80,820 farms/season |
| **Number of collectors involved** | 1648 persons/day | |
| **Harvested area** | 22 ha/day | 2,649 ha/season |
| **Truckloads** | 42 truckloads/day | 5,051 truckloads/season |

**Box 2: Example of employment at different process levels of a value chain (continued)**

In addition to the 100 avocado wholesalers, there are also about 1,648 active collectors. These actors play the most critical role in the avocado value chain, as they harvest and collect the avocados. They visit farmers and harvest one or two trees per visit. In total, over 80,000 farmers are involved, with an estimated harvested area of more than 2,600 ha.

| Assumptions for these calculations | |
|---|---|
| **Average harvest per tree** | 100 kg/tree |
| **Mean no. of trees per farmer** | 5 trees/farmer |
| **Turnover per collector** | 200 kg/day |
| **Number of trees per ha** | 150 trees per ha |
| **Average truck load** | 8 ton/truck |

This data does not include the employment the sector generates for a business service provider like the bamboo basket makers. All fruit are transported in large bamboo baskets, with each basket containing about 100 kg of avocadoes. This means that every day, about 3,368 bamboo baskets are required. As the baskets are recycled, and data was not collected about this factor, no estimate was made of the employment generation for bamboo basket makers, but it must be significant.

Source[2]

Employment throughout beef cattle value chains in Eastern Indonesia was calculated by Waldron et al.[3] as part of a study to identify options for increasing the incomes of the poor. Employment statistics were not kept by official sources, so estimates of people involved in production, trading, slaughter, and retail were calculated using a series of steps and assumptions listed in Table 1. These estimates revealed that over 1.6 million were employed directly in the beef cattle value chain. Of these, over 1.5 million were smallholder cattle farmers, 15,000 cattle traders, around 19,000 people employed in the slaughter sector, and 7,000 people who selling beef in wet markets. The results showed that the sector employs millions of people, mostly small-scale participants operating in fragmented and labour-intensive structures in rural and peri-urban areas.

2. S.v. Wijk, *Analysis of the Dak Lak Avocado Chain. Dalat, Vietnam*, FreshStudio for GTZ SME Project, 2006.
3.S. Waldron et al., *Eastern Indonesia agribusiness development opportunities - analysis of beef value chains*, Report prepared by Collins Higgins Consulting Group Pty Ltd for the Australian Centre for International Agricultural Research (ACIAR), Project AGB-2012-005, 2013, https://ei-ado.aciar.gov.au/value-chain-studies/beef-value-chain.html



**Table 1. Estimated employment in Eastern Indonesia cattle and beef chain, 2011**

| | 3 provinces | East Java | NTB | NTT | Assumptions |
|---|---|---|---|---|---|
| **Cattle producers** | | | | | |
| Cattle | 6,191,741 | 4,727,298 | 685,810 | 778,633 | |
| Cattle producers | 1,547,935 | 1,181,825 | 171,453 | 194,658 | Four cattle head per household |
| **Cattle trade** | | | | | |
| Certified slaughter | 624,752 | 528,050 | 54,476 | 42,226 | NTT 2010 |
| Uncertified slaughter | 154,080 | 132,013 | 13,619 | 8,448 | NTT recorded uncertified slaughter 2010. Other, uncertified 25% of certified slaughter |
| Cattle exports 2011 | 227,778 | 148,593 | 19,515 | 59,670 | |
| Total | 1,006,610 | 808,656 | 87,610 | 110,344 | |
| **Cattle traders** | | | | | Derived from total cattle trade (slaughter and exports) divided by average throughput per actor |
| Village traders | 8,388 | 6,739 | 730 | 920 | 10 head per month |
| Sub-district traders | 4,194 | 3,369 | 365 | 460 | 20 head per month |
| District traders | 2,467 | 1,982.00 | 214.73 | 270 | 34 head/month |
| Inter-island traders | 19 | | | 19 | Actual number |
| Inter-regional traders | 17 | 10 | 3 | 4 | Actual number |
| Total | 15,086 | 12,100 | 1,313 | 1,673 | Sum above |

| | | | | | |
|---|---|---|---|---|---|
| | **Slaughter** | | | | Derived from total slaughter (certified & uncertified) by average throughput per actor |
| Butchers | 3,245 | 2,750 | 284 | 211 | Average 20 head/month or 240 per year |
| Butcher crew/workers | 12,981 | 11,001 | 1,135 | 845 | Average four crew per butcher |
| By-product traders | 3,245 | 2,750 | 284 | 211 | Average one per butcher |
| Total | 19,471 | 16,502 | 1,702 | 1,267 | Sum above |
| | **Beef retail** | | | | |
| Beef production | 124,500 | 109,487 | 10,418 | 4,595 | |
| Wet market stallholders | 6,822 | 5,999 | 571 | 252 | Beef production by stall sales volumes (50kgs/ day, 365 days/year). Assumes all beef sold through wet markets |
| | **Total estimate chain actors** | | | | |
| | 1,589,314 | 1,216,425 | 175,038 | 197,850 | |
| | **Other** | | | | |
| Cattle markets | | 110 | 9 | 2 | Official statistics, but many not active |
| Slaughterhouses | 693 | 158 | | 54 | Recorded certified plants only |
| Trucks | 1,095 | 316 | 34 | 39 | Seven head/ truck/day, 365 days/year, for all cattle trade |
| Workers on trucks | 3,286 | 949 | 103 | 118 | Three people per truck and loading/unloading |

Source[4]

4. S. Waldron et al., *Eastern Indonesia agribusiness development opportunities - analysis of beef value chains*, Report prepared by Collins Higgins Consulting Group Pty Ltd for the Australian Centre for International Agricultural Research (ACIAR), Project AGB-2012-005, 2013, https://ei-ado.aciar.gov.au/value-chain-studies/beef-value-chain.html



## Step 3
## Determine impact of market channels, governance and technology

The next step is to analyse employment for different market channels, governance systems, or applications of technology. An example of distribution of employment between market channels is shown in Figure 1. In the Bangladesh shrimp industry, there are two distinct market channels for shrimp farm fry inputs (hatcheries and wild fry collectors), and two distinct market channels between shrimp farms and processing plants. The employment generated in each market channel can easily be seen by looking at the FTE figures for each process step.

Agri-processors such as this coffee drying factory in Pleiku, Gia Lai province, provide employment for many workers in central Vietnam.
Photo: FocusGroupGo/Rodd Dyer

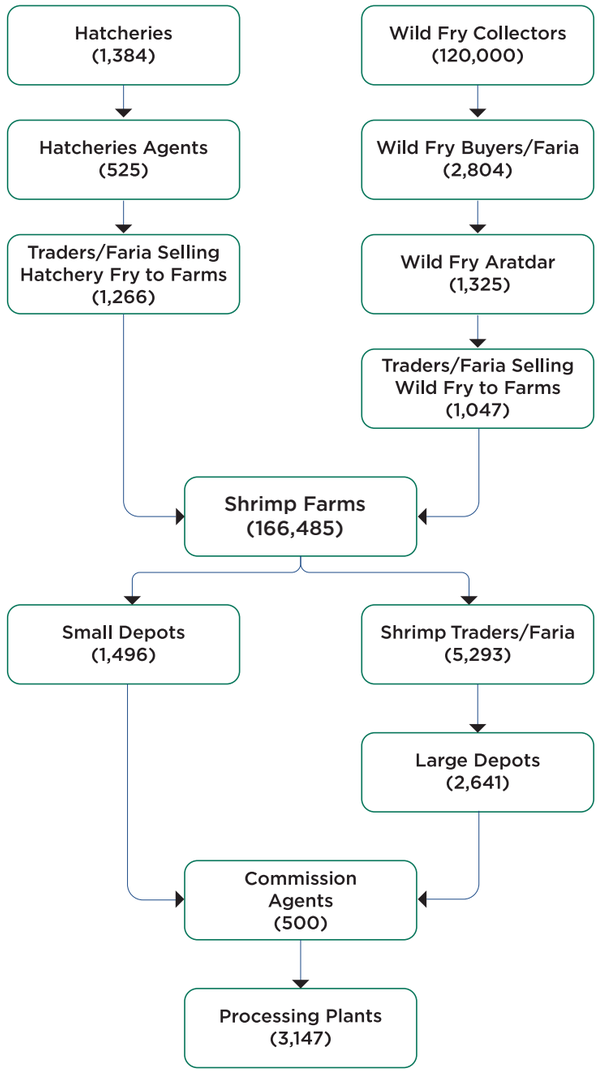



Figure 1. Example of employment distribution in different market channels within the value chain

Notes:

- Figures in brackets are quantity of FTE employment
- Faria, Aratdar, and agents are specific types of middlemen engaged in the shrimp value chain in Bangladesh

Source: BCAS (2001)[5]



In some cases, different market channels within a value chain may involve similar (or the same) actors but have different governance structures (e.g. informal linkages versus contract linkages). Figure 2 shows the employment levels for each of the three market channels in the Zambian cotton value chain, each with its own governance structure, levels of employment at each process level for each of the three governance structures.

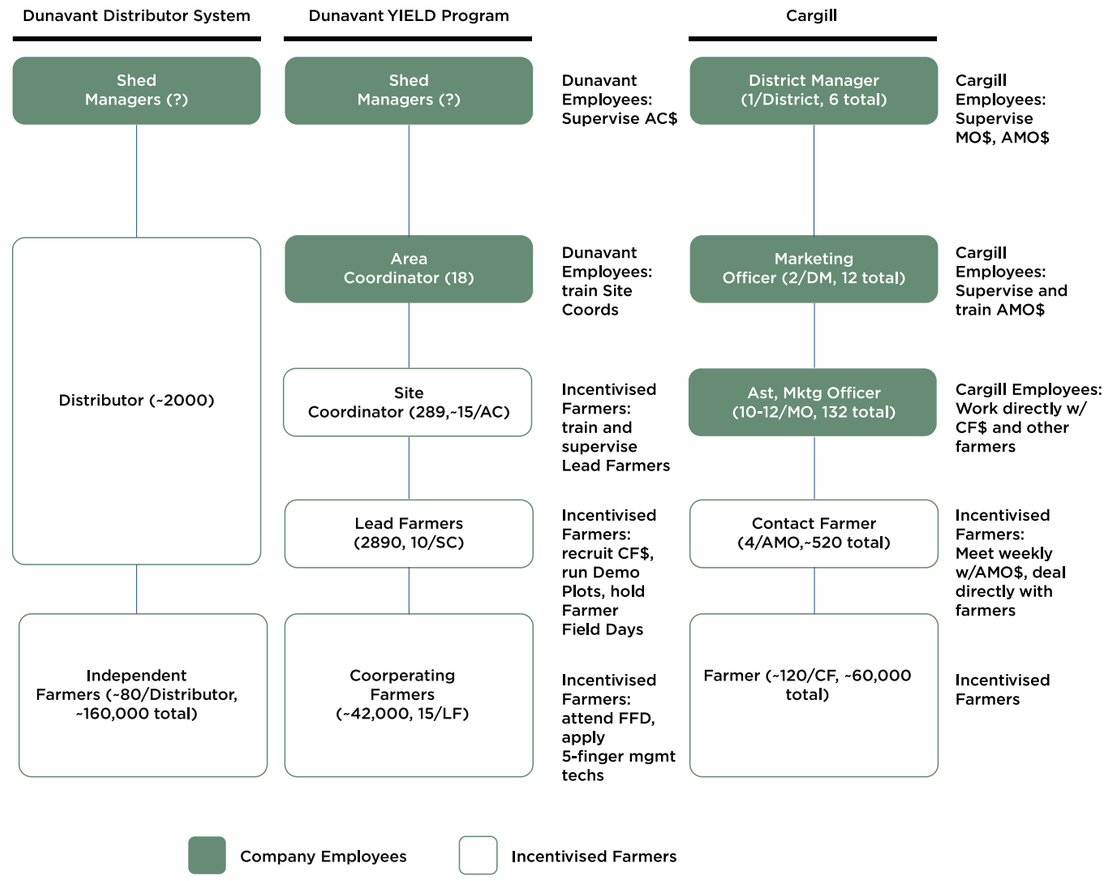



Figure 2. Example of employment across different governance structures in the cotton value chain in Zambia.

5. BCAS, *The Costs and Benefits of Bagda Shrimp Farming in Bangladesh: An Economic, Financial and Livelihoods Assessment*. Dhaka, Bangladesh, Bangladesh Center for Advanced Studies, DFID, World Bank, 2001.

## Women and the informal economy

In many cities in low- and lower-middle income countries, poor people depend heavily on the informal economy to secure their livelihoods. At a global level, women make up a substantial share of employment in the informal sector[6,7,8]. For example, in Hanoi, many poor women are involved in informal food systems, working as market retailers, shops owners and staff, and street vendors[9]. It is important to critically analyse why women enter the informal sector, and how they benefit. Understanding enabling conditions for the poor and for women is the first entry point to open up new economic opportunities for them.

The guiding questions below provide some ideas for this critical thinking:

- What advantages exist for women traders to enter informal markets (e.g. street vending) instead of formal markets (e.g. supermarkets)?
- What resources, information, and knowledge are important for women traders in informal markets?

It is worth noting that in countries such as China and Vietnam, large-scale manufacturing and construction sectors also provide a lot of off-farm, formal employment for women (and men). It is therefore relevant to ask questions about the advantages, barriers, and risks that exist in relation to these employment opportunities.

The application of technology, particularly labour-saving technologies, affects the amount and type of employment, as well as the skills required at different chain process levels. Modern, highly mechanised or industrial agri-market channels are often capital-intensive compared to "traditional" and smallholder-based market channels. However, even sophisticated value chains with highly capital-intensive, technology-based downstream processing (e.g. cassava-starch, coffee, and cocoa) can provide employment for thousands of farmers and traders for material production and supply.

6. S. Chant and C. Pedwell, Carolyn, *Women, gender and the informal economy: an assessment of ILO research and suggested ways forward*, International Labour Office, Geneva, 2008.
7. J. Charmes, 'The Informal Economy Worldwide: Trends and Characteristics, Margin', *The Journal of Applied Economic Research*, vol. 6, no. 2, 2012, pp. 103–132. https://journals.sagepub.com/doi/10.1177/097380101200600202
8. V. Moghadam, 'Gender and Globalization: Female Labor and Women's Mobilization', *Journal of World-Systems Research*, vol. 5, no. 2, 1999, pp. 366-389. http://jwsr.pitt.edu/ojs/jwsr/article/view/139
9.J. Agergaard and V.T. Thao, 'Mobile, flexible, and adaptable: female migrants in Hanoi's informal sector', *Population, Space and Place*, vol. 17, no. 5, September/October 2011, pp. 407-420.



To gain a more comprehensive understanding of the potential employment implications of changes in capital and technology within value chains, it is important to determine the levels of employment that are generated within market channels with different technological structures.

In many cases, the development of higher-tech market channels within a value chain can be expected to lead to a decrease in the level of employment. This is due to the use of more capital-intensive technology. Table 2 show the employment generated from selling one tonne of fresh vegetables through different retailing channels with different technological structures. These results suggest that as retailing "modernises", employment at this process level decreases.

**Table 2. Employment generated by vegetable sales**

| Market channel | Employment generated by selling one ton of fresh vegetables per day |
|---|---|
| **Street vending** | 13 Street Vendors |
| **Traditional markets** | 10 retailers |
| **Small shops** | Eight shop vendors |
| **Medium-scale supermarkets** | Five employees |
| **Large-scale supermarkets** | Four employees |

Adapted from[10]

## Step 4 Determine employment for categories of actors

The next step undertakes a disaggregated analysis of employment for categories of actors defined in Step 1. This can be done for different process levels across the chain, and between market channels, governance systems, or technologies.

10. P. Moustier et al., (eds.), *Supermarkets and the Poor in Vietnam*, French Agricultural Research Centre for International Development (CIRAD) and Asian Development Bank (ADB), Hanoi, 2006.

If there are two important categories for analysis (for example, gender and income group), then information on the numbers of actors by category at each level of the chain could be presented in a matrix; (see the example in Table 3).

**Table 3. Example matrix for showing the number of actors of various classifications at each process level of the chain**

| | | Farmer | | Collector | | Trader | | Wholesaler | | Retailer | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Women | Men | Women | Men | Women | Men | Women | Men | Women | Men |
| **Number of People** | Poor | | | | | | | | | | |
| | Average | | | | | | | | | | |
| | Better-off | | | | | | | | | | |
| **Number of people** | Unskilled | | | | | | | | | | |
| | Low-skilled | | | | | | | | | | |
| | High-skilled | | | | | | | | | | |

## Step 4
## Determine employment for categories of actors

(Continued)

If the focus of the analysis is on a single category (for example gender), then it may be easier to incorporate the information into a value chain map. Figure 3 shows an example of incorporating information about employment of women at different process levels of different market channels within a spice value chain in Tanzania[11]. By combining information about the percentage of women employed at different process levels with the profit margins, the value chain map shows how women are concentrated in certain value-chain nodes in which they earn small margins.

If a future project in this example was aimed at women's economic empowerment, this value chain map would be very useful for identifying where women are concentrated in the value chain and possible entry points for intervention. This is a first step to developing interventions that foster more inclusive and equitable outcomes.

11. R. Bullock, 'Contracting and gender equity in Tanzania: using a value chain approach to understand the role of gender in organic spice certification', *Renewable Agriculture and Food Systems*, vol 33, no. 1, 2018, pp. 60-72.



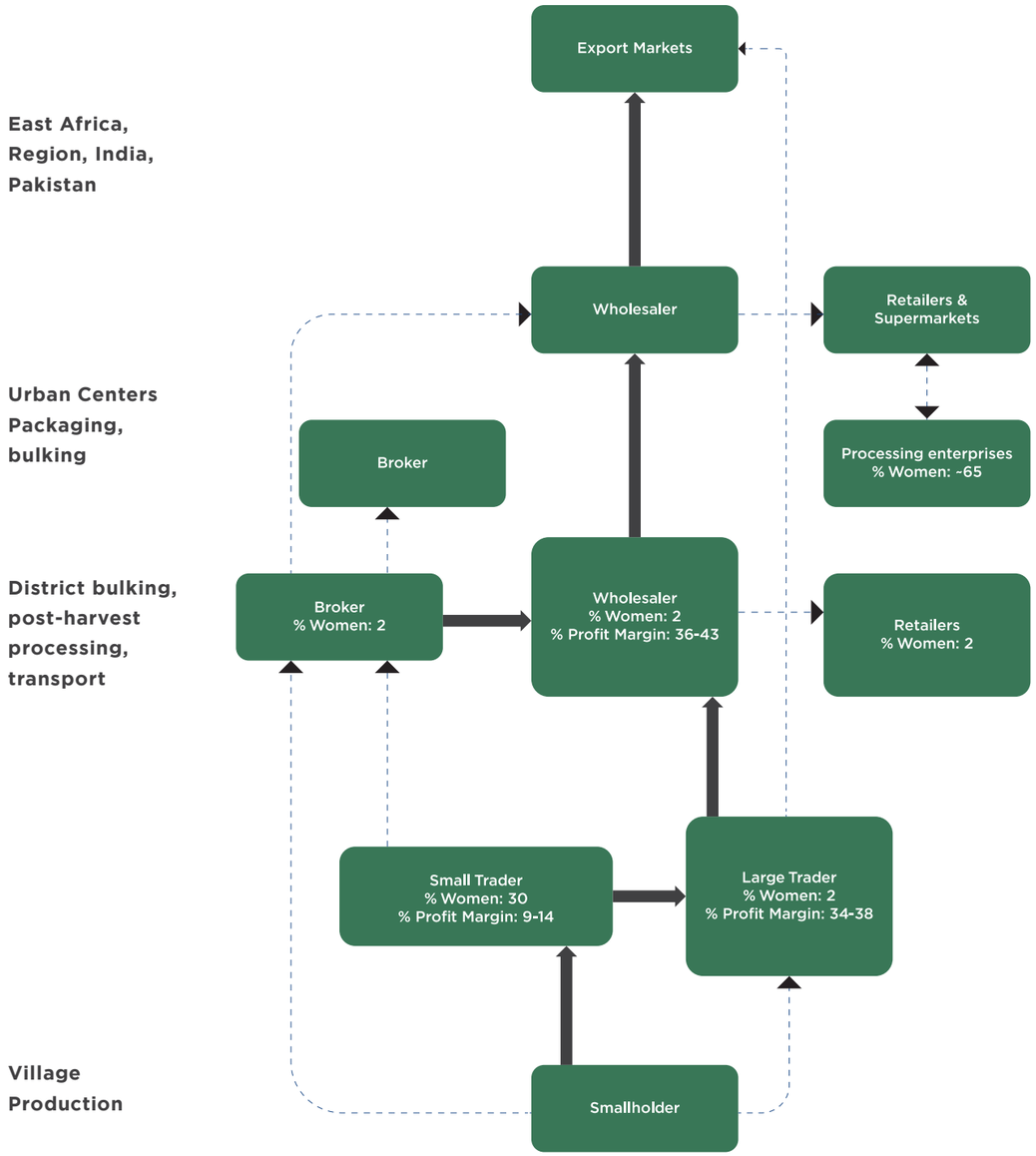



Figure 3. Proportional employment of women at different process levels of various market channels within the Tanzanian spice value chain

## Step 5
## Determine employment variability over time

This step analyses variability in employment over time. Both permanent and part-time work should be considered. This is particularly important for agricultural value chains where labour demand and supply, as well as employment, is highly seasonal or variable between years.

When considering value chain options and interventions, it is essential to understand if, and when during the year labour shortages may occur. For example, major shortages can exist when labour-intensive activities such as planting or harvesting coincide during the same season for multiple crops. Periods of seasonal out-migration of rural labour to cities for paid work can also create labour supply problems. Furthermore, in many areas there is a declining trend in the availability of labour for rural employment.

The simplest approach to estimate employment is to survey actors about the number of full-time and part-time people employed each month of the year. An example of the type of question is shown in Box 3. It is also important to understand the types of farm or enterprise activities labour is employed for, and the number or proportion of women and men employed.

**Box 3: Example of survey question for calculating employment levels**

How many people are employed in part-time and full-time capacity by the value chain actor? The number of part-time and full-time employees are entered for each month.

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Full-time labour** | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| **Part-time labour** | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

Actors can also be easily surveyed about seasonal labour constraints, whether there is surplus, sufficient, or a lack of labour during each month of the year. An example of the type of question is shown in Box 4. Periods where there is lack of labour may be an opportunity for employment, or a critical constraint to the value chain.

Disaggregated analysis can be used to compare and graphically represent the seasonal employment and labour constraints for different groups of actors based on income, gender, ethnicity, and poverty status. For example, Box 4 shows a questionnaire section on seasonal labour constraints – these can be analysed and presented for different income categories (Figure 4).



**Box 4: Example of survey question for calculating labour constraints**

What is the seasonal labour constraint for the value chain actor? Get the actor to place a ☑ or a ☒ in the appropriate row for each month.

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Surplus Labour** | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| **Enough Labour** | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| **Lack of Labour** | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

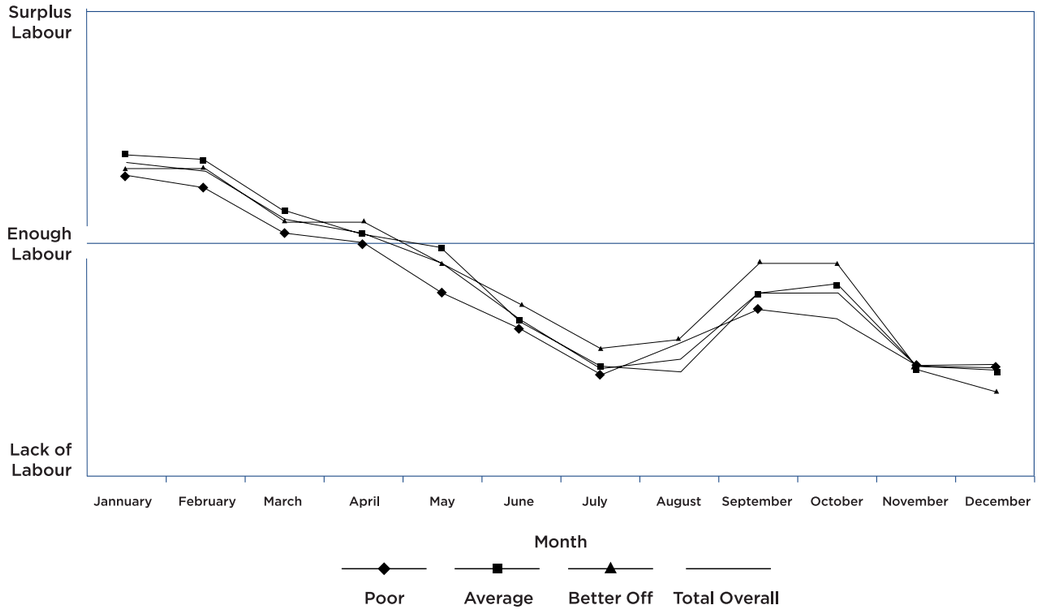



Figure 4. Graphic presentation of labour constraints by different household types over the year. Source[12]

Gathering information on seasonal employment patterns at most process levels of the value chain is relatively straightforward. Gathering information on seasonality of labour use at the farm level is more complex, due to the larger number of activities that farm households are often involved in. Information on seasonal patterns of labour use at farm level can be collected in the field using participatory techniques, such as proportional piling (Box 5).

12. UNDP and NERI, *Macroeconomics of Poverty Reduction Project - Improving Farm Family Incomes in Lao PDR*, Prepared for the United Nations Development Programme and the National Economic Research Institute of Lao PDR, Vientiane, Lao PDR, 2005.

### Box 5: Proportional piling for gathering information on seasonal labour use patterns on farm

This exercise uses a large sheet of paper (A3 or A0). Get the farmer to list all farm and non-farm activities and sources of income and livelihood. Using seeds, ask the farmer to partition and weight each activity according to total household labour use in different seasons over the year. After the farmer has finished weighting, review the results with the farmer. Do pair-wise comparisons between the cells, asking the farmer to verify that the relative weightings are correct.

The example shown below is an analysis of a farming system in Mindano, Philippines. The picture indicates that the household spends an equal amount of time over the year "saging" their banana trees (weeding and cutting on a regular basis) and taking care of their single cow, "Baka". They have a second field where they plant maize in July-Oct and rotate with sweet potato (camote) and squash. Finally, under the banana trees, they plant a small bit of taro (gabi), which they harvest one year later (hence the activities all occur in the Jan-Feb period).


In order to ascertain seasonal labour differences between categories of farmers (e.g. male/female, poor, medium, better-off, ethnic minority/majority), it is generally advisable to have separate focus group discussions with each group. This will enable a clearer picture of seasonal labour use by each category to emerge.

The importance of understanding seasonal supply and demand in labour is also demonstrated in a study of agricultural development in Central Tibet by Waldron et al.[13]. In this study seasonal labor use was calculated based on estimated labor requirements (expressed in labor units) per month for general non-agricultural household jobs, off-farm work, livestock-related activities and cropping activities. The result in Table X show when household labor demand is balanced against supply, there is a significant labor surplus in winter months (where cold weather precludes cropping activities and animals are penned night and day) and a significant labor deficit in summer when crop and livestock production activities are greatest, and there is additional labor demands for dairy processing.

Households in Central Tibet use various labor allocation strategies such as mutual help, bartering and hard work to free up household members to work off-farm in summer off-farm employment times. In addition, labor demands during summer have been reduced by adopting simple mechanisation technologies (cultivation and butter churning) or organisational initiatives (herding).

13. S. Waldon, Pubuzhuoma, C. Brown, et al., 'Agricultural Development in a Tibetan Township'. *HIMALAYA, the Journal of the Association for Nepal and Himalayan Studies*, January 2016, Vol. 35:2. Article 7, 2016.



**Table 4. Key labour use indicators (CAEGTibet model results)**

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Total labour use (days)** | 24 | 25 | 28 | 45 | 74 | 74 | 73 | 47 | 43 | 58 | 50 | 26 |
| **General household labour (percent)** | 48 | 44 | 40 | 25 | 15 | 15 | 15 | 24 | 26 | 20 | 23 | 43 |
| **Off-farm labour (percent)** | 0 | 0 | 0 | 0 | 40 | 41 | 41 | 0 | 0 | 17 | 40 | 0 |
| **Cropping labour (percent)** | 6 | 6 | 14 | 13 | 4 | 3 | 3 | 13 | 7 | 15 | 6 | 0 |
| **Livestock labour (percent)** | 39 | 44 | 41 | 59 | 38 | 38 | 38 | 60 | 63 | 46 | 28 | 51 |
| **Ultilization of available labour (percent)** | 38 | 41 | 46 | 74 | 121 | 120 | 120 | 76 | 70 | 94 | 82 | 43 |

## What Should be Known after Analysis is Complete

After having followed all the steps, you should be able to answer the key questions outlined below:

- What are the differences in employment within and between different process levels of the value chain?
- What are the impacts of the distributional outcomes of the value chain on the poor, women and other disadvantaged groups, both currently and in the future?
- What are the changes in employment that result from the development of various types of value chains (e.g. vegetable trade through traditional, open-air markets versus modern supermarkets)?
- What is the impact of various governance systems on employment distribution at various levels of the value chain?
- What is the impact of various value chain technologies on employment distribution at various levels of the value chain?

Cassava harvesting provides employment in Dak Lak province in Vietnam.
Photo: ©2009CIAT/NeilPalmer

Casual employment. Labourers unload fresh cassava roots at a starch factory in western Laos.
Photo: FocusGroupGo/Rodd Dyer

# Tool 8
# Options for Upgrading

# Introduction

## Evolution of upgrading strategies

Value chain analysis is a useful tool to **evaluate options for upgrading within the chain**. Identifying upgrading solutions and strategies is often the final step of value chain analysis, prior to implementation of interventions. Analysing upgrading draws on the results and information provided by the other value chain tools.

Upgrading describes how individuals, firms, and value chains can produce better products, become more efficient, or move into more skilled activities in order to improve performance and returns in higher-value markets. Originally conceived for industrial firms in global value chains, **product, process, functional, and inter-chain upgrading** were identified as core strategies for enhancing market integration, production efficiency, and growth[1].

For inclusive development of agricultural value chains, upgrading aims to enhance competitiveness in ways that also benefit and empower smallholders or resource-poor chain actors. In recent years, greater focus has been placed on the technical, social, and institutional barriers that limit the integration and performance of smallholders and the poor in agri-food chains and markets[2]. This has led to **vertical coordination, horizontal coordination, and the external enabling environment** being included in the suite of upgrading dimensions for smallholder agri-value chains[3,4].

This broader approach to upgrading places greater emphasis on both the distribution of benefits and the governance and institutional contexts affecting chain conduct, structure, and performance. These factors directly determine whether smallholders and the poor can access and participate equitably in the chain. They also influence people's access to knowledge and skills, and the innovation and technology adoption processes within the chain[5].

## Upgrading livelihoods

In the context of inclusive value chain development, upgrading ultimately provides a mechanism to improve the livelihoods of smallholders and the poor. However, it is often evident that the effects of upgrading on smallholder farmers and the rural poor cannot

1. J. Humphrey and H. Schmitz, *Governance and Upgrading': Linking Industrial Cluster and Global Value Chain Research*, Brighton, Institute of Development Studies, 2000.
2. S. Bolwig et al., 'A methodology for integrating developmental concerns into value chain analysis and interventions', cited in J. Mitchell and C. Coles (eds.), *Markets and Rural Poverty: Upgrading in Value Chains*, London, Earthscan and IDRC, 2011, pp. 21–45.
3. S. Bolwig et al., 'Integrating Poverty and Environmental Concerns into Value-Chain Analysis: A Conceptual Framework', *Development Policy Review*, 2010.
4. J. Mitchell, C. Coles, and J. Keane, *Upgrading Along Value Chains: Strategies for Poverty Reduction in Latin America*, Briefing Paper, 2009.
5. C. Kilelu et al., 'Value Chain Upgrading and the Inclusion of Smallholders in Markets', *The European Journal of Development Research*, vol. 29, no. 5, 2017, pp. 1102–1121.



be understood in the same way as upgrading of firms in industrial value chains. First, rural households do not operate solely as profit-maximising entities. By necessity, their livelihood strategies need to incorporate income diversification, household food security, risk mitigation, and income generation through off-farm labour. Therefore, their priorities may not always align with upgrading strategies of a commercially-oriented firm or chain. Second, smallholders or the rural poor often lack key livelihood assets; that is, the financial, human, social, physical, and natural capital[6] needed to successfully participate in, or adopt, an upgrading solution.

The concept of livelihood upgrading has been introduced by Nielson[7] as an integrating process whereby the cumulative benefits from upgrading and value capture within a value chain or area, as well as the generation of more income, contributes to positive livelihood outcomes and regional development. This approach recognises that certain productive livelihood assets, such as natural, financial, human, and social capital, are critical to inclusion in the value chain.

Knowledge about livelihood assets can be used to assess the socio-economic importance of a chain and its levels of inclusiveness; to determine who will benefit the most from certain chain development processes; to identify target groups for value chain upgrading strategies; to design interventions aimed at benefiting those groups; and to monitor and evaluate outcomes and impacts from intervention[8].

Following this lead, the toolbook deliberately takes a disaggregated and nuanced approach to inclusiveness and upgrading that considers specific groups of smallholders or poor households (e.g. landless, women, ethnic minorities, and youth) and their various livelihood strategies and assets.

In the context of inclusive value chain development, the following overarching questions are relevant to identifying suitable upgrading opportunities that benefit smallholders and resource-poor actors:

- What value chain upgrading strategies and solutions will be most appropriate for the poor or targeted groups?
- How can they access and benefit from rapidly transforming agri-food markets?
- How can they become more competitive and

6. UNDP, *Guidance Note: Application of the Sustainable Livelihoods Framework in Development Projects*, United Nations Development Programme, 2017.
7. J. Neilson, Livelihood Upgrading, cited in S. Ponte, G. Gereffi, and G. Raj-Reichert (eds.), *Handbook on Global Value Chains*, Edward Elgar Publishing, 2019.
8. D. Seville, A. Buxton, and B. Vorley, *Under what conditions are value chains effective tools for pro-poor development?*, The Ford Foundation, January 2011.

commercially oriented?

- How can they meet the increasing product and quality standards and food safety requirements in domestic and international agri-food markets?
- What key knowledge, skills, capabilities and linkages will be required? What technologies and innovations, or institutional changes, will be needed?
- Do the poor or other target groups have the necessary livelihood assets and capabilities?
- Which solutions have the greatest chance of generating sustainable impact at scale?

## Objectives

The aim of this tool is to identify upgrading solutions and strategies that improve value chain competitiveness, in ways that provide livelihood benefits to the poor, to women, or to other target groups. The objectives are to:

- Identify the main problems and constraints affecting chain performance
- Identify possible upgrading solutions
- Evaluate and select upgrading solutions that are accessible, feasible, and desirable
- Define the upgrading strategy, interventions, and potential service providers

## Upgrading strategies

Before proceeding to the analysis steps, it is worth describing the different upgrading strategies and some examples relevant to inclusive value chain development. Four broad categories of upgrading have been proposed[9]:

- Improving value chain coordination (upgrading horizontal and vertical coordination)
- Improving process and product (process and product upgrading)
- Changing and adding functions (functional and inter-chain upgrading)
- Upgrading the institutional environment

9. C. Kilelu et al., 'Value Chain Upgrading and the Inclusion of Smallholders in Markets', *The European Journal of Development Research*, vol. 29, no. 5, 2017, pp. 1102–1121.



### Improving value chain coordination[10]

**Horizontal coordination** refers to greater cooperation and organisation between actors, often farmers, who operate at the same process level. Establishing or strengthening grower and marketing groups, associations, and cooperatives may result in better chain coordination and performance. Improving horizontal coordination can enable smallholders to upgrade product quality, achieve economies of scale, reduce transaction costs, perform new functions, and share risk. Benefits may also include better access to information and knowledge, finance, training, transport, quality control, and other services. Digital and ICT technologies provide new platforms for groups to communicate, share information, and cooperate with greater efficiency.

The rationale for collective action, and the quality of group governance and leadership, will determine the effectiveness of farmer group enterprises. Groups formed primarily to capture institutional support or funding are unlikely to become a viable, competitive, or sustainable enterprise that benefits members.

**Vertical coordination** refers to the business relationships between different types of actors in the chain (e.g. between input suppliers, farmers, traders, processors, wholesalers and exporters). Strengthening vertical coordination often involves moving away from spot transactions towards longer-term relationships between buyers and sellers. The relationships between buyers and sellers are generally built on trust and therefore take time to develop. In developed markets, characterised by well-functioning legal systems, formal contracting replaces trust to some extent. In contrast, long-distance trade in informal, traditional market systems requires high levels of trust because parties are negotiating and supplying volumes and quality, as well as managing payments, without direct physical interaction and without recourse to a written contracts or the court system.

Upgrading vertical coordination can increase exchange of information and knowledge and promote innovation. It can also provide access to critical support services and higher-value markets. Whilst trust-based coordination can reduce transaction costs, formal contracting may increase the costs of doing business. Gender norms and power imbalances, either horizontally or vertically in the chain, can also pose major barriers to greater and more meaningful participation of women.

10. The coordination information and examples presented here provide an upgrading context to the horizontal and vertical coordination sections in Tool 3 – Governance.

### Improving process and product

**Process upgrading** refers to improving value chain efficiency by increasing output volume for the same cost of production, or reducing unit cost of production. Investing in or adopting improved technologies and management practices can increase output per unit of cost. For example, can a farmer improve productivity and margins by adopting better agronomic practices and investing in fertiliser or irrigation? Or can a transporter use stronger stackable crates or larger, more efficient trucks to improve load efficiency and reduce losses?

**Product upgrading** involves improving product quality or moving to more sophisticated products, normally for higher-priced markets or segments. Product upgrading can also include processing and packaging, branding, and trademarks to make products more appealing and recognisable to consumers. As consumer income rises, the willingness to pay for better food quality, safety, freshness, consistency, and traceability increases. Product upgrading to meet this growing demand domestically or abroad requires meeting more stringent buyer and statutory standards for product and quality specifications, biosecurity, food safety, and traceability. A key question is whether smallholders, the poor, or smaller firms have the resources and capabilities to access and meet these requirements, or to benefit from upgrading. For example, is it worthwhile for poor plum growers in northern Vietnam to invest limited time and money into pruning, thinning, fertilising, pest and disease control, and post-harvest handling to access higher-prices retail markets in Hanoi?

Participation in third-party certification programs and voluntary standards (e.g. 4C, Rainforest Alliance, Fairtrade) is an upgrading strategy often encouraged for poor smallholder farmers, particularly in coffee, cocoa, and tea value chains. Certification provides consumers' confidence about environmental sustainability and ethical credentials, whilst farmers may benefit from price premiums, market linkages, and technical support. Establishing direct buyer-linkages between smallholder grower groups and roasters is a product and vertical coordination upgrading strategy in specialty coffee chains. Close relationships enable direct product feedback, technical support, and price premiums for higher quality to growers, whilst roasters capture unique quality and provenance attributes. Research has shown these programs can provide social benefits to smallholder participants, but evidence of sustainable income and livelihood improvements (where the financial benefits to farmers outweigh the financial costs) is limited[11,12].

11. J. Nielson, Livelihood Upgrading, cited in S. Ponte, G. Gereffi, and G. Raj-Reichert (eds.), *Handbook on Global Value Chains*, Edward Elgar Publishing, 2019.
12. J. Bray & J. Neilson, 'Reviewing the impacts of coffee certification programmes on smallholder livelihoods', *International Journal of Biodiversity Science Ecosystem Services & Management*, vol. 13, no. 1, 2017, pp.216-232.



### Changing and adding functions

**Functional upgrading** refers to changing the mix of functions performed by actors in the value chain, either through increasing (upgrading) or reducing (downgrading) the number of activities undertaken by individuals and firms. For example, supporting cocoa and coffee growers to adopt farm-level processing and value adding to prevent spoilage and improve quality, rather than selling ripe cherries for a lower price to traders, is an example of functional upgrading. The trend of global lead firms in the coffee and cocoa sector to outsource the procurement of green beans to large trading firms is an example of downgrading. A critical question is whether the poor or other disadvantaged actors possess the human, financial, and social resources and capabilities required to undertake these new activities efficiently.

Functional upgrading interventions for smallholders may be more effective in situations where a group or institution provides effective horizontal coordination. For example, vegetable grower groups may be able to attract higher prices by taking on collective grading and packing functions. "Shortening the chain" by excluding intermediaries, such as collectors and other intermediary traders, and redistributing their functions amongst other actors, is a commonly proposed smallholder upgrading strategy. However, care is required, as these actors often provide critical and specialised services that cannot be easily replaced by smallholders.

Governments can also use policies to promote functional upgrading at the sectoral level. For example, Indonesia levies a 5% export tax on unprocessed raw cocoa beans to encourage downstream processing and value adding within the country. These strategies will only deliver the desired effects if those activities can be efficiently undertaken locally. Global markets for the processed products are competitive, so efficiency is critical for profitability and sustainability.

**Inter-chain upgrading** refers to using the knowledge and skills acquired in one chain to enter a new, higher-value value chain or market segment. For example, many Robusta coffee farmers in the central highlands of Vietnam quickly applied their experience and skills to integrate pepper into their farming systems for higher returns.

### Institutional upgrading

**Upgrading the enabling environment** refers to improving the institutional context influencing the value chain, including support services, legal and policy frameworks, and financial services. The institutional environment often has major impacts on value chain competitiveness and is therefore an important upgrading dimension to consider. For example, developing suitable loan products,

streamlining loan application procedures, and simplifying collateral requirements are institutional upgrading solutions that can improve smallholder farmers' access to formal finance.

Some policy changes may impact negatively on smallholder farmers and the economy more broadly, a form of institutional downgrading. For example, organic production decrees by national governments can adversely impact smallholder vegetable farmers. As fertiliser and chemicals use is reduced, productivity, quality, and incomes may also decline.

The following steps can be used to identify upgrading strategies and solutions that will improve value chain competitiveness whilst providing livelihood benefits to the poor, to women, or other target groups.

# Steps

## Step 1
## Identify the main problems and constraints

The first step is to identify the main problems and constraints affecting the value chain. Identifying problems relies on collating and interpreting the findings from the previous value chain analyses, examining evidence from other sources, and getting input from technical specialists and key stakeholders. Results from mapping (Tool 2) and more detailed analyses of the value chain (e.g. Tools 3, 7) should provide a comprehensive picture and evidence.

The analysis will probably identify a range of problems affecting different process levels and actors or groups in the chain. Particular attention should be given to identifying issues and barriers faced by smallholders, the poor, women, or other target groups. For example, as shown in Box 1, women's needs are rarely considered in the design, introduction, and use of agricultural machinery and equipment.

Box 1 next page



**Box 1: Technology for women farmers**

Agricultural machinery saves both time and labour for small-scale farmers, and is increasingly available in rural areas. However, women's needs and interests are often not fully considered when new equipment are developed, introduced, and adopted by communities. As a result, they are disproportionately used and controlled by men.

The CGIAR Research Program on Roots, Tubers and Bananas (RTB) has developed a set of guidelines as part of the Gennovate initiative to support project leaders, researchers, and development workers to ensure that gender is adequately addressed in research design and interventions in the mechanisation field. The stories give us three important messages:

Firstly, agricultural machines and equipment are mostly made by male mechanics. Adjustment is often needed to make them suitable for women farmers due to their body size, physical strength, and limited experience of using them. This was the case with sweet potato silage chopping machines in Uganda and potato grading equipment in Bolivia. Adjusting to women's needs is often undervalued in the process of development and introduction, but it is a very important factor to increase its adoption rate and thus bring about greater impact.

Secondly, women's needs and interests are often ignored in the process of decision-making within the household, community, or a project. Male decision-makers may be unaware of women's real needs, or have little incentive to invest in equipment or machinery for women. This was the case in processing factories in Nigeria, where factory owners were not aware of women's health problems caused by harmful smoke and, consequently, did not invest in smoke-reducing gari fryers that could reduce their exposure and possibly increase productivity. This issue can be avoided with greater awareness of gender factors.

Thirdly, machines and equipment not only save labour and time, but also create symbolic power. In the matrilineal Ede community in the Central Highlands in Vietnam, for example, many men perceive that their decision-making power is higher than their wives' because they can drive two-wheel tractors while their wives cannot. Tractors thus enable men not only to control some aspects of farming and increase their mobility, but they also strengthen men's symbolic power. The symbolic aspect of mechanisation is a neglected topic in agricultural research. Introducing machines without adequate consideration of gender risks supporting men's symbolic power and reinforcing existing gendered power relationships.

Source[13]

13. N. Kawarazuka et al., *Gender in Agricultural Mechanization: Key guiding questions*, Lima, International Potato Centre, 2018.

It is also important that constraints within different market segments or channels of the chain are examined. For example, a study of the mango value chain in eastern Indonesia identified problems and issues in traditional retail, modern retail, processing, and export channels (See Box 2)[14] . The analysis of problems and their causes should therefore explore the scope of technical, financial, economic, socio-cultural, and institutional factors. The cause of problems and constraints may be external to the chain (e.g. trade policy) or internal within the chain (e.g. disease, weak chain linkages, or gaps in knowledge). Both can have major impacts on production costs, farm productivity, and overall competitiveness, as well as social inclusion.

A key part of the problem analysis will be to identify what technologies, innovations, and practices are currently being applied, and why. Should these be improved? What are the key knowledge and capability gaps? Where and why do these exist?

Key problems and constraints can be listed for each group of actors or process level (e.g. Box 2). A brief narrative that provides the supporting context and rationale should also be articulated for each of the main problem areas. A list of key research questions and knowledge gaps associated with upgrading is an important output of this step.

**Box 2: Main problems and constraints to upgrading mango value chains in eastern Indonesia**

A study of mango value chains in eastern Indonesia identified the main problems and constraints to upgrading mango chains in Situbondo and Lombok, the two focus districts.

**Table 1. Main constraints for different actors in the mango chain in Situbondo and Lombok districts, eastern Indonesia**

| Chain actors | Key constraints |
|---|---|
| **Farmers** | • Very low prices during the short peak mango season<br>• Lack of knowledge about early-season crop manipulation technologies practiced in Central Java and West Java<br>• Poor knowledge of fertilisation and pest and disease management<br>• Poor access to finance and limited risk-taking capacity |
| **Assembly traders and wholesalers** | • Lack of knowledge on early-season crop manipulation technologies<br>• Lack of knowledge on post-harvest pest and disease management |

14. T. Wandschneider, I. Baker, and R. Natawidjaja, *Final Report: Eastern Indonesia Agribusiness Development Opportunities - Mango Value Chain (AGB-2012-006)*, Australian Centre for International Agricultural Research, 2013.



**Table 1. Main barriers to upgrading mango chains in Situbondo and Lombok, eastern Indonesia for different chain actors (continued)**

| Chain actors | Key constraints |
|---|---|
| **Exporters** | • Lack of knowledge about post-harvest pest and disease management<br>• Poor access to quality fruit<br>• No access to large yellow and red-skin mangoes<br>• Poor understanding of export markets<br>• Lack of legal access to phytosanitary markets such as China, Japan, and South Korea, because market access protocols have not been negotiated |
| **Processors** | • Short mango season<br>• Limited product development and marketing expertise<br>• Financial constraints<br>• Limited domestic demand<br>• Strong competition in domestic and international markets from well-established processing industries from other Asian countries. |

The analysis identified four main knowledge gaps considered to be major barriers to pro-poor innovation in mango chains: 1. Knowledge of crop manipulation for early-season production; 2. Knowledge of general mango cultivation practices; 3. Knowledge of post-harvest treatments for addressing pest and disease problems; and 4. Knowledge of market preferences and opportunities in different export markets.

Source[14]

Some examples of possible value chain problems and constraints that might be identified during a diagnostic analysis are provided below:

- Yield gaps, low farm or enterprise productivity and efficiency;
- Poor product quality and inability to meet market standards;
- Low profitability, income, and employment generation;
- Inability to compete in domestic and export markets;
- High household debt, limited cash flow, and poor access to finance;
- Fragmented production and diseconomies of scale;
- The poor, women, or target groups are excluded or treated unfairly in the chain;

## Step 1
## Identify the main problems and constraints

(Continued)

- Limited horizontal coordination;
- Weak market linkages, particularly with lead firms;
- Low levels of transparency and trust;
- Gaps in key knowledge and skills;
- Gaps in basic innovation and technology adoption;
- Gaps in livelihood assets (e.g. human, social, physical, natural, financial, and political capitals) required to participate in and benefit from upgrading; and
- Weak enabling environment, including institutions and policies, and limited access to or effectiveness of support services.

## Step 2
## Identify potential upgrading solutions

The overarching question to be answered in this step is what strategies and solutions can address the main problems affecting chain structure, conduct and performance. These can be presented in a table. For example, Table 2 presents the upgrading solutions and strategies that addressed the main problems and constraints identified in the mango value chain study in eastern Indonesia[15].

**Table 2. Upgrading solutions and strategies for mango value chains in eastern Indonesia**

| Problem | Solutions | Upgrading strategy |
|---|---|---|
| Very low prices during peak of highly concentrated harvest season | Enable increased off-season production through manipulation of flowering | Process upgrading, vertical coordination |
| Very low prices during peak of highly concentrated harvest season, plus negligible mango exports | Develop exports | Inter-chain upgrading, process upgrading, product upgrading, vertical coordination |
| Very low prices during peak of highly concentrated harvest season, plus negligible commercial processing | Processing market development | Inter-chain upgrading, product upgrading, vertical coordination |

15. T. Wandschneider, I. Baker, and R. Natawidjaja, Final Report: *'Eastern Indonesia Agribusiness Development Opportunities - Mango Value Chain'* (AGB-2012-006), Australian Centre for International Agricultural Research, 2013.



**Table 2. Upgrading solutions and strategies for mango value chains in eastern Indonesia (continued)**

| Problem | Solutions | Upgrading strategy |
|---|---|---|
| Pest and diseases resulting in low-quality fruit that cannot be sold in higher-priced domestic and export markets | Improved upstream pest and diseases control to access export and other quality chains | Product, process upgrading, vertical coordination |
| Lack of access to high-price export markets such as China, South Korea, and Japan | Develop export market protocols | Institutional upgrading |
| Production dominated by a green-skinned variety (Harumanis) limits potential for export development | Support varietal development programs | Product upgrading |
| Limited access to higher-priced modern retail chains (from eastern Indonesia) | | Vertical coordination and channel upgrading |

It is likely that to achieve broad and sustainable livelihood impact, a combination of upgrading solutions and strategies will be required for different chain segments. Solutions will presumably include technical, organisational, institutional, economic, and socio-cultural dimensions. For example, a range of upgrading solutions and strategies were implemented in a project to develop certified safe vegetable value chains and increase farmer incomes in northern Vietnam (Box 3)[16].

Upgrading solutions in smallholder value chains also need to consider the innovation processes necessary for actors to acquire key knowledge and capabilities required for adoption. This includes identifying the processes, service providers, and interventions to support knowledge exchange, capacity development, joint learning, and continuous problem solving.

Analysis of the costs and benefits is essential for evaluating if upgrading strategies are appropriate and feasible for the poor and other target groups. Upgrading strategies using expensive or inappropriate technologies may expose producers to significantly higher levels of risk. Similarly, not all farm households are interested or willing to engage in functional upgrading processes, i.e. to perform new and additional functions within the value chain, such as trading or semi-processing of their crops. They may lack the required labour or capital, for example. Or the higher prices or revenue resulting from vertical integration may not compensate for the additional costs incurred.

### Box 3: Upgrading vegetable value chains and livelihoods in Moc Chau, Vietnam

A project to develop certified safe vegetable value chains from Moc Chau district in northern Vietnam demonstrates how multiple upgrading solutions and strategies were identified and implemented (Table 3). The development goal was to improve incomes and livelihoods of poor farming households, many of whom from local ethnic minorities. Moc Chau has a mild mountainous summer climate, good soils, and reasonable proximity to urban markets in Hanoi. This provides a natural comparative advantage for producing temperate vegetables during the summer season, when it is too hot to grow quality vegetables in the Red River Delta, close to Hanoi and prices are consequently higher. The district also has a reputation with urban consumers, who are increasingly concerned about food safety, for "clean and safe" agricultural products. Local farmers already produced some vegetables for traditional markets, but quality, productivity, and incomes were low. Targeted technical support, training, and capability development enabled farmers and chain actors to adopt multiple upgrading solutions over time. Some farmers growing certified safe vegetables were able to increase their incomes from US$770 to US$4550/ha. Interestingly, women were major beneficiaries, as they dominate all parts of the value chain, from production through retailing.



**Table 3. Range of upgrading solutions and strategies to develop safe vegetable value chains and improve livelihoods in Moc Chau district in northern Vietnam**

| Intervention solutions | Upgrading Strategy |
|---|---|
| Introduction of new vegetable varieties | Product upgrading |
| Improved agronomic practices (seedlings, fertilisation, plastic mulching, protected cropping) | Process upgrading |
| Improved chemical use, SOPs, and record-keeping | Process and product upgrading |
| Safe Vegetable certification and VietGAP standards | Also institutional upgrading |
| Establishment of grower groups and cooperatives to provide economies of scale and coordination | Horizontal coordination, process, and production institutional upgrading |
| Development of market linkages with supermarkets and specialty vegetable stores in Hanoi | Vertical coordination, inter-chain upgrading, and product upgrading |
| Registration of a certified trademark with District Government | Product upgrading and improving enabling environment |
| Improved post-harvest management and market coordination (packing, grading, labelling, refrigeration) | Process and product upgrading, horizontal and vertical coordination |
| Enhanced linkages of grower groups with District Government and research institutions | Institutional upgrading vertical coordination and improving enabling environment |

Source[16]

16. ACIAR, *Quality vegetables find their markets*, Partners Magazine, vol. 4, Australian Centre for International Agricultural Research, 2017, https://reachout.aciar.gov.au/quality-vegetables-find-their-markets.

## Step 2
## Identify potential upgrading solutions

(Continued)

A brief description and rationale for each upgrading solution should also be developed as part of this step. The technical and economic details, as well as the impact logic of different solution options, can help evaluate and prioritise options in the next step. The description of the upgrading solution and impact logic to enable off-season production in mango value chains in eastern Indonesia is provided in Box 4 as an example.

The guiding questions below can help develop the description and rationale for each of the upgrading solutions:

- What activities and interventions are required to implement the strategy and solution? Where are the entry points in the value chain?
- What is the impact logic of the upgrading strategy?
- What are the potential impacts on yields, cost of production, prices, and margins? What is the likely impact on net incomes and employment for actors in the chain?
- What are the costs and capital, labour, and land investments required?
- Who will be the key target beneficiaries? How many people will likely benefit?
- What new knowledge, technologies, and innovations are required? What practices must be adopted? What training, capability development, and technical support is required?
- Where is the upgrading entry point? Who will be the key innovation influencers and adopters?
- Who are the potential solution providers? What role do lead firms have? What roles do external support services and institutions have? How can the enabling environment be improved?

**Box 4: Description and rationale for upgrading solution to promote off-season production in eastern Indonesia"**

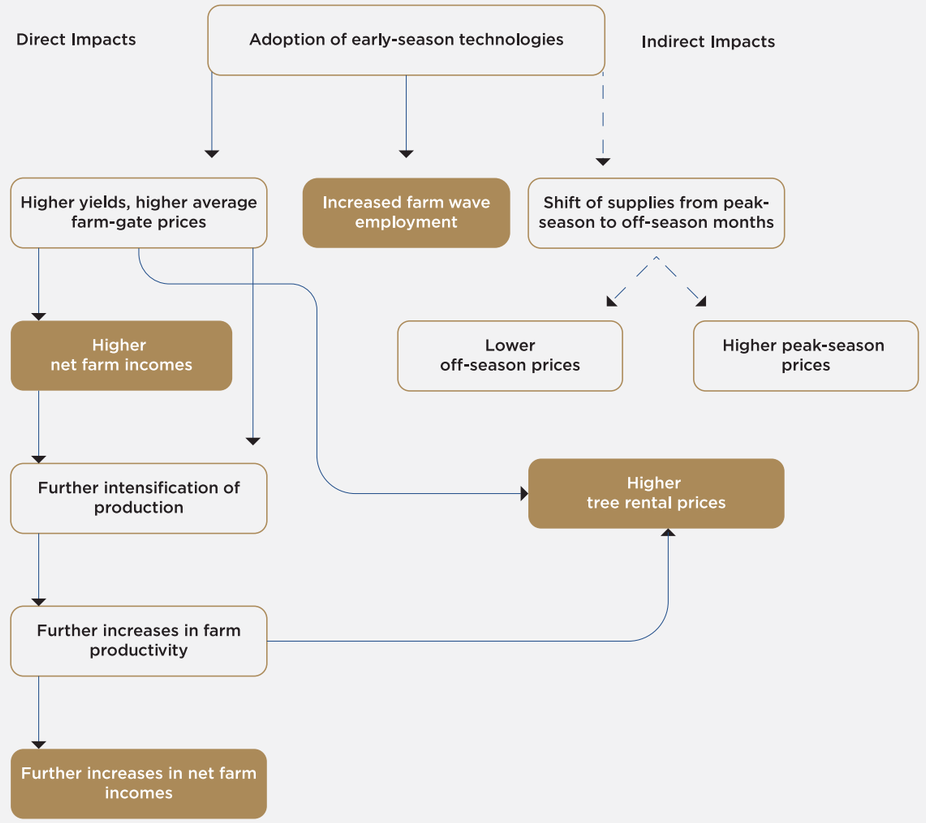
The adoption of crop manipulation technologies (e.g. by treating mango trees with Paclobutrazol and fungicide to stimulate early flowering) can shift 20-50% of total production to earlier in the season, when prices are significantly higher. Whilst mango growers adopted crop manipulation in Western and Central Java, there was little awareness or adoption by growers in East Java and East Nusa Tenggara (NTB). The analysis showed crop manipulation could significantly increase yields, prices, and revenue per tree, whilst costs were relatively low and within reach to many farming households. For a household with 20 trees, an investment of US$90 would generate US$300 in additional net farm income. For every 3,000 households, annual farm income could be increased by almost US$2 million.



**Box 4: Description and rationale for upgrading solution to promote off-season production (continued)**

Field activities aimed at improving awareness, knowledge, and adoption of farmers were targeted at commercially-oriented growers with 20-100 trees. Chemical companies and input sellers also stood to benefit from increased farm sales of active ingredients. Chemical company representatives, extension officers, input suppliers, and farmers were the key solution providers.

The direct and indirect impact logic of adoption of early-season technologies for increased farm incomes is provided below.




Source[17]

17. T. Wandschneider, I. Baker, and R. Natawidjaja, *Final Report: 'Eastern Indonesia Agribusiness Development Opportunities - Mango Value Chain'* (AGB-2012-006), Australian Centre for International Agricultural Research, 2013.

## Step 3
## Evaluate the feasibility and potential impact of upgrading options

The third step will evaluate different upgrading strategies and solutions, and prioritise the ones most likely to improve value chain performance and livelihoods. The descriptions and rationale for the upgrading solutions developed in Step 2 should inform this step. Involving technical specialists and key stakeholders in the evaluation process can add critical insights and promote ownership of the process and outcomes.

A set of criteria that reflect the main value chain development goals can assist the evaluation and prioritisation process. For example, upgrading strategies in the eastern Indonesian mango value chain study were evaluated against two broad criteria: 1. The potential to increase the income of target households; and 2. The potential to implement, scale up, and benefit large numbers of poor households[17].

A qualitative assessment of different options based on the rationale and business case developed in Step 2 can be made using a set of criteria or guiding questions (see below). Alternatively, a systematic evaluation and scoring of specific criteria applied to each upgrading solution can be adopted. This would be very similar to the process used for selecting value chains (Tool 1). The criteria can be adapted to select upgrading interventions, as follows:

1. **Relevance to target groups** describes the number of men or women in the target groups likely to benefit from upgrading, and the potential contribution to their income or livelihoods.

2. **Market segment size and growth** characterises the potential and scope of the market channel or segment targeted for upgrading.

3. **Competitiveness** of target groups refers to the ability of the target group to compete on price and quality. Competitiveness depends on all five types of capital, including natural capital (amount of land, type of land, quality of land, access to water) and social capital (networks).

4. **Opportunities for chain upgrading** is particularly important, and refers to:

- The potential for the upgrading solution to improve competitiveness and result in better incomes and livelihoods for target groups
- The likelihood an upgrading solution will be adopted, leading to required practice change and innovation
- Presence and capacity of lead firms, institutions, and support services to promote knowledge and technology upgrading with target groups.

Product and process upgrading, with horizontal and vertical coordination. Farmers packing potatoes in Moc Chau, northern Vietnam for wholesale and retail markets in Hanoi.
Photo: Bui Thi Hang

Technical feasibility is a key indicator influencing whether an upgrading solution will improve competitiveness and incomes. Low-tech feasible technologies can be disseminated more readily based on their reputation and ease of adoption - expensive promotion campaigns are often not necessary. However, there are many other aspects to consider when deciding if an upgrading option is within reach of targeted actors, and what the likely benefits will be.

The livelihood assets and strategies of smallholder farmers or the poor are critical factors influencing their ability to participate in, and benefit from, upgrading. Therefore, a key part of evaluating upgrading opportunities is to assess whether solutions are accessible, feasible, or desirable for poor smallholders, for women, or for other specific target groups. This will directly influence the level of upgrading adoption, innovation, and success.

The following guiding questions can help evaluate how well-aligned an upgrading solution is to the livelihood strategy and assets of poor men and women in target groups:

- Does the upgrading solution align with goals? For example, what are the main household priorities in terms of food security, off-farm income, income diversification, improving on-farm income, or increasing market orientation?
- Does the upgrading solution align with their available human, financial, social, physical, and natural assets? For example:
    - Can the poor and/or women do it? Do they have the required knowledge and skills to implement or operate it? (human capital)
    - Can the poor and/or women afford it? Is the investment required for upgrading within their reach? (financial capital)
    - Can the poor and/or women access it? Are the necessary services in place and accessible to them? (social capital)
    - Who are the innovators in the community that can showcase innovations and lead or mentor others? (human and social capital)
    - What mechanisms exist for collective action, and what is the ability to share, maintain, and collectively develop skills and knowledge? Is the necessary social capital available? (human and social capital)

Ethnic minority farmers in Hoa Binh were able to upgrade their incomes by establishing a chayote value chain to markets in Hanoi. Photo: ©2009CIAT/NeilPalmer

- What are the risks that upgrading may lead to unintended harmful consequences for one gender or social group? For example, is there increased risk of indebtedness or increased labour demands for women? Is the new technology only available to men, or only affordable for the better-off, excluding the poor and socially disadvantaged groups from the value chain?

Whilst there is often a focus on smallholder producers, the evaluation of upgrading solutions should also consider the likely impacts on poor men and women at other stages of the value chain. For example:

- **Labourers:** Will upgrading create or reduce employment opportunities in the chain? By how much? What skills will be required? Can the poor or women participate?
- **Micro, small, and medium enterprises (MSME):** How will upgrading impact input sellers, traders, transporters, agents, and other agribusinesses in the chain? Will they be part of the solution? Will they be winners or losers?
- **Consumers:** Will upgrading lead to food that is more affordable, of higher quality, safer, or more nutritious for poor consumers?

Priority should be given to the solutions and problem areas with the most potential to benefit performance of the whole chain and have a direct positive impact on the poor. In some circumstances, this may mean an intervention is targeted at downstream actors or external services providers. For example, traders and exporters may require support to access and develop new high-value export markets that will benefit everyone in the chain, rather than focusing initially on the farm level. In other instances, improving access to finance may require targeting financial institutions, traders, or input suppliers to develop innovative value chain financing products.

The impacts an intervention in one part of the chain will have across the value chain as a whole should also be considered. As an example, adoption of new product handling and quality systems by a trader or processor may require farmers to use or purchase new crates or handle harvested product in a different way.

When assessing upgrading solutions and technologies from a gender perspective, there are specific issues to be considered (Table 4). As demonstrated in the avocado export value chain example in Box 5 below, the context and position of women within their household and community has a major influence on their constraints and possible approaches to upgrading.



**Table 4. Important aspects to look at when selecting the best potential upgrading options for women**

| Issues | Details to look for |
|---|---|
| Relevance to women in terms of needs, interests, and capacity | Women's needs and interests in technology and their capacity to handle it are different from those of men, as women are responsible for childcare and other household chores in addition to income-earning activities. Consequently, women are often interested in time and labour-saving technology, as well as small, light, and simple tools that can be used and maintained without depending on men. |
| Husbands' disapproval<br>Factory owners' disapproval | Husbands' disapproval is often a key reason for preventing women from participating in agricultural innovation or upgrading in the value chain. It is important to engage and provide men with sufficient information from the planning stage, as they are often household decision-makers. Similarly, when introducing new technology for women in processing factories, a male owner may not be aware of opportunities for improving productivity by accounting for the needs and preferences of women workers. It is important to explain to the decision-maker that supporting women can also benefit him. |
| Roles of local institutions | Identify organisations associated with upgrading solutions and technologies (e.g. farmers' organisations) and negotiate with them to facilitate women's participation. |
| Policy environment for gender equity | Identify local and national policies for women's empowerment and agriculture. Design interventions along with relevant policies to bring synergy. |
| Dissemination through women's social networks | Women often trust women-to-women information and knowledge sharing through their personal social networks rather than through formal institutions. Creating women role models and training women leaders are therefore important for technology dissemination. |

**Box 5: Identifying gender-based constraints for upgrading: A case of the avocado export value chain in Kenya**

Facilitating women producers' upgrading from the local value chain to the more commercialised value chain is a promising approach to bringing gender equitable development outcomes. However, careful attention is needed to understand social as well as economic constraints for women's upgrading. A gender analysis in the avocado export value chain in Kenya by Oduol et al.[18] is insightful. Local women often produce a local avocado variety and sell it locally. There are few barriers to women participating in this local value chain, but profit is also very limited. Growing exotic varieties for export requires financial resources, as well as access to male-dominated farmer organisations and/or male brokers who have connections to exporters. Women farmers have varied constraints according to their household characteristics, such as male-headed and male-managed households, male-headed but female-managed households, and female-headed households. For example, women in the male-headed households can access farmer organisations via their husbands, but they have to negotiate with their husbands to invest in export varieties. Women in the female-headed households can make decisions on their own and control resources. In this case, their constraints are more economic than social. The authors propose multiple upgrading strategies for different groups of women. This research paper is very detailed and highly recommended to those who are interested in integrating gender into value chain analysis.

Source[18]

## Step 4
## Describe the upgrading strategy and intervention activities

Once the most promising upgrading solutions have been selected, the next step involves describing the upgrading strategy and intervention activities in more detail. These upgrading implementation plans should provide information about the guiding questions below:

- What combination of upgrading strategies and solutions will be implemented?
- What are the intervention activities? What is the sequence of implementation?
- What are the expected technical, value chain, and livelihood outcomes?
- Who are the target groups and main beneficiaries?
- What knowledge, skills, and technologies need to be developed?
- What is the process for innovation, technology adoption, and practice change?

18. J. B. A. Oduol et al., 'Women's participation in high value agricultural commodity chains in Kenya: Strategies for closing the gender gap', *Journal of Rural Studies*, vol. 50, 2017, pp. 228-239.



- How will knowledge, skills, and/or services be improved or delivered? By whom? How will they be paid for?
- Who are the key change agents? What is the role of the private sector, local government, and other supporting services and institutions in delivery of the solution?
- What are the processes for scaling up and scaling out?
- What are the risks and weaknesses?

Building on the eastern Indonesia mango value chain study, a summary of upgrading interventions to enable early-season mango production is described below in Box 6.

**Box 6: Summary of interventions to enable early-season mango production**

The mango value chain study in eastern Indonesia described three interventions to develop the knowledge and skills required to enable early-season production. There were:

**a. Demonstration trials** - A series of farm demo-trials targeting large numbers of mango grower groups, collectors, and traders, facilitated with close involvement of field and sales staff of chemical companies and extension officers to address knowledge gaps hindering adoption of crop manipulation technologies.

**b. Exchange visits** to selected districts in Western and Central Java where mango farmers were successfully adopting early-season technologies. Participant selection would target growers and traders who are early adopters and influencers in their East Java communities.

**c. Information products and training** – Distribution of information products through chemical company and input supplier sales networks and delivery of subsidised training on manipulation techniques to grower groups in conjunction with company field staff.

In terms of gender, most upstream activities in the value chains are dominated by men. Upgrading strategies that targets women would need to focus on mango processing, marketing, and retailing, particularly in high-quality markets where women are more present. Upgrading quality management systems would also provide greater employment opportunities for women throughout the chain.

Source[19]

19. T. Wandschneider, I. Baker, and R. Natawidjaja, *Final Report: 'Eastern Indonesia Agribusiness Development Opportunities - Mango Value Chain'* (AGB-2012-006), Australian Centre for International Agricultural Research, 2013.

## Step 4
## Describe the upgrading strategy and intervention activities

(Continued)

Careful consideration should be given to the logical sequencing of interventions. For example, there is little point developing a safe vegetable certification system to supply modern retail markets if production volumes are too small and inconsistent, and varieties and quality produced by smallholders are unsuitable. Farmers must first adopt better agronomy, varieties, chemical use, and post-harvest management before more sophisticated record-keeping, standard operating procedure (SOPs), and certification can be implemented. Technical interventions, as well as human (e.g. knowledge and skills), social (e.g. vertical and horizontal coordination and governance), and institutional (e.g. enabling environment, support services, and policies) interventions all need to be sequenced in a logical order.

Learning and innovation processes are a fundamental part of value chain upgrading. The upgrading plan needs to describe how smallholders and other actors will acquire the necessary knowledge and skills. What mechanisms will be used to support adoption of new technologies and improved practices? Who will provide these services? Particular attention should be given to how women can be better engaged in innovation processes and upgrading activities. Some examples are presented in Table 5.

**Table 5. Considerations for including women into knowledge and skill upgrading activities**

| Knowledge and skills development | Gender considerations |
|---|---|
| Technical skills upgrading and training | Identify technical skills relevant to women and ensure that training is organised at a location and time where women can access and are at ease. Avoid mornings, when women are usually busy. Also consider having female trainers and use language understandable to women. |
| Demonstrations | Ensure women (and men) don't just provide labour, but contribute their opinions and perspectives about demonstration activities in a participatory monitoring and evaluation process. |



**Table 5. Considerations for including women into knowledge and skill upgrading activities (continued)**

| Knowledge and skills development | Gender considerations |
|---|---|
| Exchange visits | Ideally, women participants should engage with other women to share gender-specific issues and ideas. This will help promote relevance and encourage women to adopt innovations in their gender domains. |
| Entrepreneurship skills improvement | Consider developing business, finance, and marketing skills for small-scale informal entrepreneurial activities where women are concentrated. |

Inter-chain upgrading. High returns resulted in widespread establishment of pepper production in Central Vietnam. This included some farmers shifting from coffee to pepper.
Photo: Pham Thi Hanh Tho

Other chain actors or external service providers can provide supporting services as part of a market-based solution. For example, an international agri-commodity trading company or processor may deliver technical support, training, inputs, or equipment to contracted farmers. However, research institutions, government, development organisations, cooperatives, and industry organisations are also important potential providers of extension, vocational training, financial, and technical support services.

In many agricultural value chains, the lack or quality of supporting services creates barriers to upgrading. Therefore, when considering who will deliver upgrading solutions, it is important to evaluate the accessibility, quality, and suitability of services and the providers to the poor or target groups. Indeed, upgrading the skills of support services, such as local extension officers, is often a necessary component of chain upgrading.

Multi-stakeholder processes (e.g. platforms, partnerships, and networks) have been increasingly used to promote inclusive innovation and upgrading in value chains. These processes aim to integrate smallholders within agribusiness, government, research, and development networks. Evidence suggests that whilst these processes can promote smallholder market inclusion, their effectiveness may be constrained by the prevailing value chain structures, timeframes, and institutional context[20].

20. C. Kilelu et al., 'Value Chain Upgrading and the Inclusion of Smallholders in Markets', *The European Journal of Development Research*, vol. 29, no. 5, 2017, pp. 1102–1121.

Upgrading beef cattle management with improved forages and keeping livestock in a pen has boosted production and income for farmers in Dak Lak, central Vietnam.
Photo: ©2014CIAT/GeorginaSmith


Product and process upgrading. Adoption of better varieties and seedling transplanting improves vegetable establishment and quality for smallholder farmers in Moc Chau, northern Vietnam.
Photo: Bui Thi Hang

Product upgrading. Sun-drying parchment coffee on racks in Benteng Alla village in Sulawesi ensures greater quality control for specialty markets.
Photo: Derby Sumule

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